THE UNIVERSITY OF TEXAS BULLETIN
No. 3732: August 22, 1937

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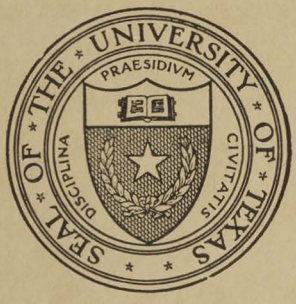
By

J. T. PATTERSON
Professor of Zoology

Bureau of Research in the Social Sciences
Study No. 24

Anthropological Papers, Vol. I, No. 2



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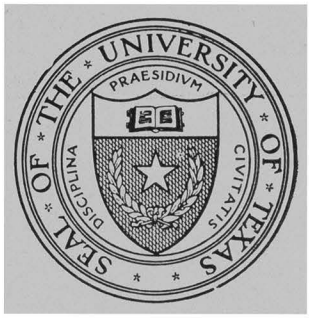

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The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston

Cultivated mind is the guardian genius of Democracy, and while guided and controlled by virtue, the noblest attribute of man. It is the only dictator that freemen acknowledge and the only security which freemen desire.

Mirabeau B. Lamar

Anthropological Papers of The University of Texas

Vol. I. No. 2

J. E. PEARCE, Editor

Homo sum: humani nihil a me alienum puto

BOAT-SHAPED ARTIFACTS OF THE GULF SOUTHWEST STATES

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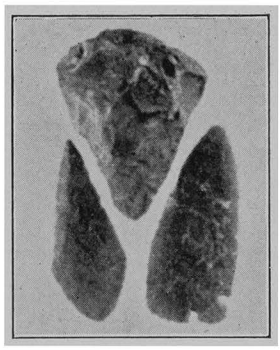
Professor of Zoology



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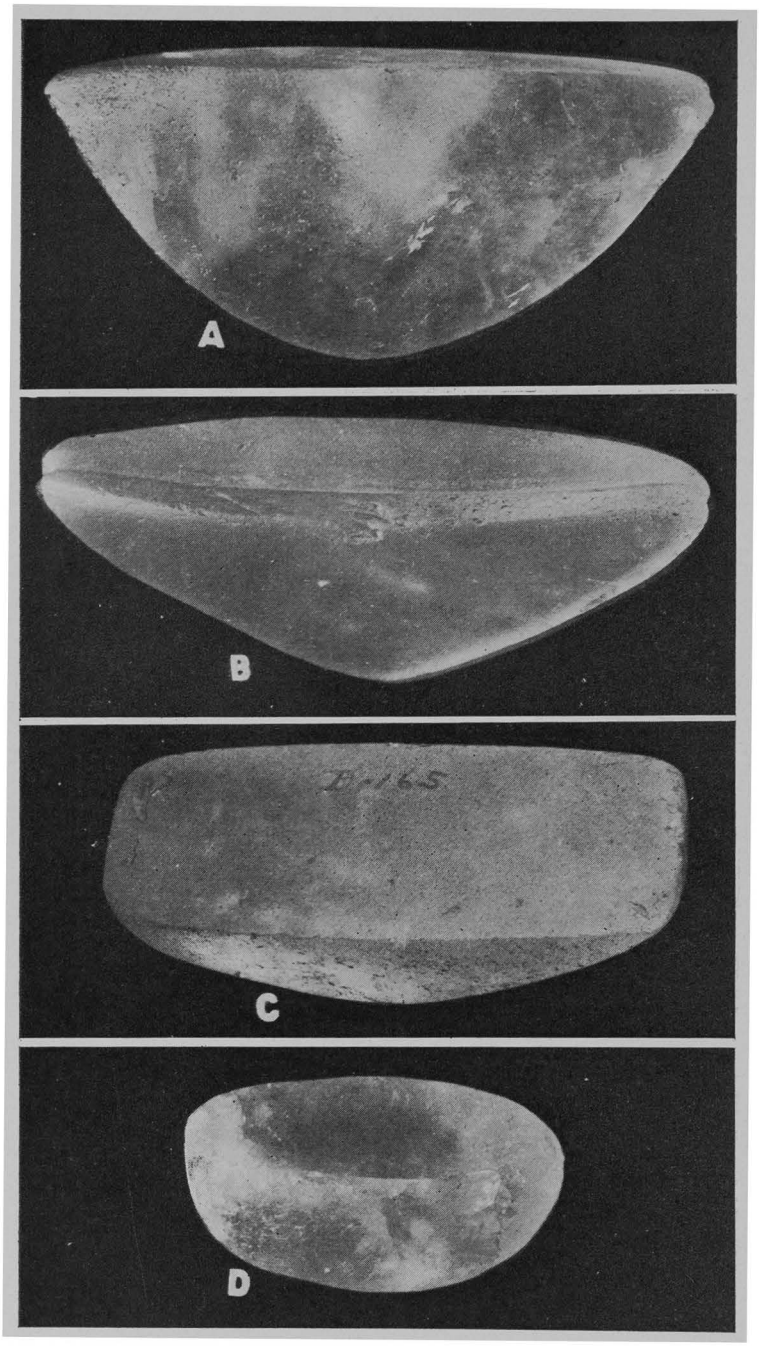


Frontispiece. A, B, C, and D are photographic illustrations of specimens 242, 241, 178, and 87, respectively, photographed against a background of black velvet in order to bring out the transparency of these crystal quartz pieces. Reproduced at natural size.

EDITOR'S NOTE

Dr. Patterson has done in this, as in his former bulletin in this series on *The Corner Tang Flint Artifacts of Texas,* a careful and accurate piece of work. The boat-shaped artifact of the Mississippi Valley seems to be an element of the Mound Builder culture but, if so, has spread widely out into the marginal areas of its early home.

It has been a puzzle to all who have come in contact with it and until now there has been no consistent explanation of it. The reason for this is not far to seek.

The atlatl was not known until just now to have been in use throughout North America for a long period antecedent to the coming of the bow and arrow. It could not have occurred to early writers on the "boat stone," therefore, that it may have had its meaning in association with this weapon.

The first positive information of the association of these stones with the atlatl coming from field work in archaeology was published by Kidder and Guernsey in 1919, confirmed and extended in their later publications in 1921 and 1931 (see references in the body and in the bibliography of this bulletin). These authorities did not attack, however, the general problem of the meaning and significance of these stones in Indian culture; hence the pertinence and importance of this paper.

The early ideas (1) that they were votive offerings to water gods or (2) charms worn upon the persons were, for the following reasons, very improbable explanations. In the first place, men begin to attribute supernatural powers to objects, usually if not always, only after long observation of the presence of some natural or concrete quality in the object closely related to the magical power later assumed. In charms, we must look for some early utilitarian use or some deleterious or mischievous natural character which may be abstracted or exaggerated to set up the mystical character. For instance, the fact that stone knives and projectile points may kill might easily lead to these objects, or the stone from which they are made, being regarded as possessing, generally, power over life and death. Once mystical powers are set up in a substance or object they may be transferred to another

substance or object because of the possession of one striking quality in common, as in the case of the sun and gold in ancient Peru.

In the second place, stone boats could never have served either men or water spirits at any time, so would have been a meaningless offering from men to these sprites.

The suggestion came to the editor years ago (1) that many of these stones certainly had been attached firmly to some object (from evidences on the stones) and (2) had probably been attached to atlatls (this from reading somewhere, he cannot now recall where, that the ancient Peruvians sometimes attached polished stones to their atlatls).

Dr. Patterson, the editor believes, has finally settled the problem of the meaning of the *boat-stone.* The credit goes chiefly to him because the editor's idea was only a vague supposition, and that not altogether original, while Patterson's evidences and proofs are concrete and based on painstaking prolonged study.

The editor is glad therefore, to add this to the growing, and he hopes significant, series of Anthropological Papers of The University of Texas.

J. E. PEARCE, *Editor.*

THE BOAT-SHAPED ARTIFACTS OF THE GULF SOUTHWEST STATES

By J. T. Patterson

INTRODUCTION

This paper will deal with the boat-shaped artifacts and certain other more or less related problematical forms from the Gulf Southwest states of Arkansas, Louisiana, Oklahoma, and Texas. These artifacts are commonly called boat-stones and have usually been classed with the ornamental-problematical forms. They have been alluded to by Fowke and Holmes (1907) as "Prehistoric objects of polished stone having somewhat the shape of a canoe, the use of which is unknown." These authors state that they are found sparingly in most of the states east of the Mississippi River and in Canada, and that objects analogous to them are found on the Pacific coast. Some of the western forms have the general figure of the native canoe, while others, resemble the eastern forms. They surmised that boat-stones "were employed as charms or talismans and carried about the person."

The writer's interest in the problem of the boat-stones of the Gulf Southwest was aroused as a result of a study made on their occurrence and distribution in central Texas. The nature of the distribution of the Texas specimens indicated that the boat-stone culture must have entered the state from the northeast, in all probability from Arkansas and Louisiana. A preliminary investigation of the conditions in these two states was made in August, 1936, and the fact was then revealed that many more boat-stones had been discovered there than in Texas. This is especially true for the southwestern part of Arkansas.

Among other collections examined was that of Mr. Harry J. Lemley of Hope, Arkansas. While there, Mr. Lemley suggested that if the writer wished to make a detailed study, he would be glad to send his entire collection to Austin for that purpose. After consultation with Professor J. E. Pearce, it was decided to accept the offer, and accordingly Mr. Lemley sent the collection to the University in September, where it remained for several weeks. For

reasons that will be made clear in the section on distribution, it was thought best to include in the proposed study the group of four states mentioned above.

SOURCES OF MATERIAL

The Lemley collection of over two hundred pieces furnished the main source of specimens for this study. In addition to its large size, this collection is rich in types, has a record of each piece, and contains many of the finest wrought specimens to be seen in any collection. It was therefore natural that it should be drawn upon for many of the types and for illustrative material. Several other persons or institutions have also generously contributed pieces from Arkansas for the same purposes. These are as follows: Mr. R. W. Aldrich, Austin, Texas, four pieces; Mr. W. I. Jenkins, Tyler, Texas, sixteen pieces; Mr. P. H. Walser, Bryan, Texas, five specimens; Anthropology Museum, Austin, Texas, two specimens; Mr. C. W. Grimes, Tulsa, Oklahoma, one piece; and Mr. A. T. McDannald, Houston, Texas, thirteen specimens. In addition to the specimens that were loaned, a large number of records of Arkansas boat-stones, to be used only in plotting the distribution map, was furnished by the following: Professor S. C. Dellinger, Fayetteville, Arkansas, seventy-one records; Professor S. D. Dickinson, Magnolia, Arkansas, eleven records; Mr. W. P. Williams, Nashville, Arkansas, two records; Mr. Kenneth C. Miller of the Museum of the American Indian, New York, twelve records; and Dr. Neil M. Judd of the National Museum, Washington, D.C., three records. Finally, several records of boat-stones from Arkansas were found in the literature.

For the State of Louisiana, we have a total of fifty-five records of discovered pieces, of which forty have been examined. Six of these are in the Lemley collection; one was loaned by Mr. Emmett Chisum, Monroe, Louisiana; twelve are in Mr. E. F. Neild's collection at Shreveport, Louisiana, which the writer had the privilege of examining; and twenty-one are in the collection of the late George Williamson, at the Louisiana State Normal College, Natchitoches, Louisiana. Through the courtesy of Mrs. Williamson, these specimens were sent to Austin for study and photographing. The records of specimens not examined, and used only in plotting the map, were from the following sources: four from Mr. B. S. Sweete and three from Mr. W. B. Safford, both of Natchitoches, Louisiana,

three from the Museum of the American Indian, three from the National Museum, and two from Dr. J. A. Ford, Baton Rouge, Louisiana.

The writer has been able to obtain but thirty-one records of boat-stones from Oklahoma. With the exception of the extreme eastern part of the state, they seem to occur much less frequently in Oklahoma than in any of the other three states. Through the courtesy of the secretary of the newly organized society, "The Oklahoma State Archaeological Society," Mrs. Dorothy Field Morgan, Tulsa, several records have been secured, which otherwise would not have been obtained. The following records are from this source, all from persons living in Oklahoma: Mr. Clark Field, Tulsa, one; Mr. Sam Davis, Talequah, two; Mr. L. B. Smith, Braggs, five; Mr. W. H. Villine, Byars, two; and Mr. Tate Compton, Kenton, two. Professor F. E. Clements, Norman, Oklahoma, reports one specimen from Le Flore County. Other reports from Oklahoma are, one each by Mr. Harry Lyons and Mr. Allen Hall, both of Muskogee, and Mr. Kenneth C. Miller, Museum of the American Indian, New York, two, one of which is illustrated in Plate 27. Mr. Lester Wilson of Wylie, Texas, loaned three, all from Le Flore County. There is one specimen in the Lemley collection from this same county. Finally, the remaining records were supplied by Mr. A. T. McDannald of Houston, Texas.

The writer has made an extensive search for boat-stones in Texas, and has obtained a total of eighty-six records. All but three of these pieces have been seen and personally examined. Since all except six are listed in the tables, where credit is given, it is not necessary to name the many collectors in the state who have loaned their specimens for study. The writer is under a deep obligation to the owners for their generosity. It is obvious that without their aid and coöperation, this paper could not have been written.

Special acknowledgment is due Mr. Harry J. Lemley of Hope, Arkansas, not only for the loan of his fine collection, but also for the splendid spirit of coöperation which he has shown throughout the entire course of study. Likewise, special acknowledgment is due Professor J. E. Pearce, both for valuable suggestions and for permission to publish the article as one of the contributions in the

series of Texas Anthropological Papers. Finally, special acknowledgment is due Dr. H. B. Stenzel, Geologist in the Bureau of Economic Geology, The University of Texas, for his kindness in determining the composition of all except a few of the specimens listed in the tables. His extensive knowledge of Petrography makes his determinations especially trustworthy. Thanks are due the following: to Mr. A. T. Jackson and Mrs. Helen D. Barnard, both of the Department of Anthropology, The University of Texas, for assistance in obtaining records; to Mr. A. B. Griffen of the Department of Zoology for much help in making the photographs.

CLASSIFICATION AND TERMINOLOGY

It was realized from the first that if an orderly presentation of this comparatively large group of boat-shaped artifacts was to be made, it would be necessary to arrange them under some system of classification. At one time there were approximately 250 specimens displayed on the laboratory table. Since stone artifacts were made by hand, and not by a machine, no two pieces are ever identical. To view this group on the table, before it had been arranged into a classified series, gave one the impression of a bewildering array of varieties or types. After experimenting with different arrangements, they were finally grouped under thirty-eight varieties, with twenty-eight special or odd pieces left unclassified. Records of pieces received after the tables had been made up were not classified. The new records were, however, added to the totals used in plotting the distribution map.

Varieties were established by placing in a given group all specimens that showed the same structural design. After the varieties had thus been established, they were then arranged into a series, beginning with the simplest forms and ending in what were judged to be the most highly specialized groups. They will be presented in this same order in the succeeding pages of the paper. It would be possible to arrange these varieties into a series of half a dozen "types." To do this it would be necessary to use only the most generalized characteristics of these artifacts as a basis for classification. In the judgment of the writer, such a classification would be of limited value, unless it could be based upon a study of a representative collection of the boat-shaped pieces, taken from their entire distributional area.

In using the arrangement of varieties as given below, the writer desires to make it clear that he does not regard the seriation as representing the order in which they may have been evolved by the Indian craftsman. It is true that the first few varieties include the simplest, and presumably the primary forms, but it is equally clear that there are two or more lines of specialization. The arrangement of the series, as well as the establishment of the varieties themselves, has been done largely as a matter of convenience for purposes of description.

The terminology to be employed in description is a matter of importance. The terminology which has been used by different writers to designate the various parts of the boat-stone has not been altogether consistent. It seems necessary, therefore, to define the main descriptive terms that will be used in the paper.

The simpler form of boat-stone has a plane and a convex surface. The former has been referred to as the flat side, the deck, or the base. The term *base* will be employed throughout this paper, and this will be done irrespective of whether or not it is hollowed out or excavated to form a cavity. The term *convex* surface will be used to designate the side lying opposite to the base. The term *side* may then be restricted to its usual meaning of side view. The termini of the long axis of the piece will naturally be called the *ends*.

In the simpler forms the convex surface is usually smooth and forms a continuously curved surface, as the name implies, but in the more complex specimens the two sides frequently do not meet. There is left between their edges a curved flat strip of varying width, which extends from one end to the other, along the crest of the entire length of convex surface. This strip has usually been called the keel, but has sometimes been designated as the comb. The term *keel* will be used, irrespective of whether it is merely a seam or ridge, or has a width as great as that of the base. In some specimens the keel is hollowed out to form a v-shaped *groove*, which, in certain perforated types, connects the two holes. The base is frequently excavated to form a hollow, which will be called the *cavity*. In case this cavity is v-shaped, like that of the keel groove, it will be referred to as a *groove-like* cavity. Finally, there should be mentioned the *notches*, which are found at the ends of certain pieces.

TABLES AND ILLUSTRATIONS

In the tables are listed all specimens which were examined by the writer, except about thirty pieces that were submitted after the manuscript had been written. These are numbered from 1 to 359, and will be referred to by these numbers in the text. Whenever the specimen bore a number used by the owner, this is given in the second vertical column. Other data displayed in the tables are, (1) The county and state sources of each piece, wherever these are known; (2) The dimensions of each specimen are given in millimeters (determined by the nearest millimeter) of the length, width, depth, and depth of cavity (formula, 47–35–17–2). In some of the first pieces examined, the depth of the cavity was not taken, and hence the fourth number in the formula is represented by a leader (—). If the specimen is unexcavated, the fourth number is shown as zero (0). In certain cone- and cup-shaped pieces, only three measurements were possible, width of base, height, and depth of cavity (formula 34 x 21 x 14). Except for a very few cases, in which the obvious composition was recorded by the writer, all determinations of the composition were made by Dr. H. B. Stenzel. Finally, the ownership of all pieces is indicated in the last column.

In the frontispiece and the plates are shown 183 individual photographs. These have been selected with the view of illustrating all of the different varieties of "boat-shaped artifacts" that were examined. This term is used for all specimens dealt with whether they have the form of a boat or not, their inclusion being due to the fact that their general qualities seem to indicate the same motivation as that of the regular boat-shaped objects. In all side and semi-side views the base side of the piece has been placed uppermost on the plates. This follows the usual custom of illustrating boat-stones, makes it easier to interpret the piece, and gives a somewhat more pleasing effect.

DESCRIPTION OF VARIETIES

Variety I. Eleven specimens have been included in what will be designated as Variety I (Table 1, 1–11). The outstanding characteristic of all of these pieces is the absence of any evidence of work on all except the side containing the cavity. They are therefore natural pebbles, usually fairly large, that have been hollowed

TABLE 1, VARIETY I

Number		County-State	Dimensions	Composition	Owner
1	1340	McLennan, Tex.	47–35–17–2	Milky quartz	Baylor Univ. Mus., Waco, Tex.
2		Milam, Tex.	49–29–14–....	Limestone	J. R. Hunt, Cameron, Tex.
3		"	75–33–41–8	Clear quartz	J. B. White, Cameron, Tex.
4		"	80–30–30–...	Sandstone	"
5		Williamson, Tex.	80–40–15–6	Limestone	N. P. Chaetham, Burnet, Tex.
6	B–15	Howard, Ark.	81–46–26–2	Trans. quartz	H. J. Lemley, Hope, Ark.
7	W–22	Hempstead, Ark.	82–53–54–18	Red quartzite	"
8		Milam, Tex.	107–49–40–....	Limestone	J. B. White, Cameron, Tex.
9		Hill, Tex.	125–58–30–....	Limestone	H. G. Moore, Waco, Tex.
10		Milam, Texas	Broken	Sandstone	Chas. Nabours, Cameron, Tex.
11		Coryell, Tex.	"	Limestone	G. deGraffenried, Waco, Tex.

out on one side. Evidently, the aboriginal workman selected a stone of the desired size and shape and proceeded to peck and grind out a cavity. A very good illustration of such a specimen is number 6, which is shown in fig. 1, Plate 1. It was made from a translucent quartz pebble of pinkish color, and had a shallow, well-made cavity, which is oval in outline.

In many of the specimens belonging to Variety I, the cavity is distinctly groove-like, that is, it is v-shaped in cross section, very much like the cavity of certain more definitely shaped boat-stones. This would be the main reason for considering them in any account dealing with the boat-shaped artifacts. Whether or not they represent the beginnings of the art of making "boat-stones" must be left open to question. In the table only two are listed from any state other than Texas. This is probably due to the fact that in collecting records from Texas, the writer included all such pieces, while the collectors from other states did not report them along with their typical boat-shaped pieces.

Variety II. Twenty-three cup-like specimens are grouped under this variety (Table 2, 12–34). They are commonly called paint cups or containers by collectors. Most of them are circular in form and usually possess a fairly deep cavity. They are closely related to those of the preceding variety, and some of them likewise show but little evidence of work outside the limits of the cavity. The group represents a series of objects beginning with rather crude pieces and ending in several finely made cups. Eleven of these are illustrated in figures 2 to 12, Plates 1 and 2.

Specimen 33 (fig. 2) is a crude piece, but the condition of its surface shows that it had been pecked into shape and slightly ground. The cavity is deep but not well finished. Specimen 25 (fig. 3) was made from the half of a hollow, spherical sand-stone concretion. The edge of the cup has been worked to form a smooth rim. Specimen 27 (fig. 4) was also made from the shell of a concretion, and is of particular interest on account of what it contained when discovered. Mr. Lemley's records show that when found it contained two small diamonds and two small particles of rock crystal. It was discovered in Pike County, Arkansas, at a point not over ten miles from the well-known diamond mines located in that county.

TABLE 2, VARIETY II

Number		County-State	Dimensions	Composition	Owner
12	W–17	Pope, Ark.	34x21x14	?	H. J. Lemley, Hope, Ark.
13	Mc–8	Natchitoches, La.	36x12x14	Cream colored chert	L. S. N. C., Natchitoches, La.
14	B–65	Van Buren, Ark.	37–28–31–14	Sandstone	H. J. Lemley, Hope, Ark.
15	Mc–33	Natchitoches, La.	38x13x3	Brown chert	L. S. N. C., Natchitoches, La.
16	W–11	Hempstead, Ark.	38–30–24–17	Porous chert	H. J. Lemley, Hope, Ark.
17	B–157	"	40–17–21–17	?	"
18	Mc–9	Natchitoches, La.	41x17x6	Flint concretion	L. S. N. C., Natchitoches, La.
19	Mc–64	De Soto, La.	41x24x20	Sandstone concretion	"
20	W–13	Miller, Ark.	41x23x21	Porous chert	H. J. Lemley, Hope, Ark.
21	W–16	Pope, Ark.	41–30–22–13	Quartzite	"
22	B–114	Hempstead, Ark.	45–28–16–12	Porous chert	"
23	B–71	"	47–34–29–15	Clay ironstone	"
24	W–6	"	47–43–26–16	Limonite	"
25		Travis, Tex.	48x18x7	Sandstone concretion	Walter Fiegel, Austin, Tex.
26	34	Claiborne, La.	50–35–35–	Ironstone concretion	E. F. Neild, Shreveport, La.
27	W–20	Pike, Ark.	50–44–22–19	Porous chert	H. J. Lemley, Hope, Ark.
28		Williamson, Tex.	52x23x7	Sandstone	D. E. Stone, Round Rock, Tex.
29	W–1	Clark, Ark.	53x33x23	Sandstone	H. J. Lemley, Hope, Ark.
30	Bo–23	? La.	55–35–23–14	Oolitic limestone	L. S. N. C., Natchitoches, La.
31	B–19	Hempstead, Ark.	57–42–21–8	Fossil shell	H. J. Lemley, Hope, Ark.
32	B–183	"	58–46–34–27	Porous flint	"
33	W–10	Clark, Ark.	60–43–35–16	Sandstone	"
34	B–99	Nevada, Ark.	Broken	Clay ironstone shell	"

Specimen 16 (fig. 6) has a well-worked groove on the convex side of the cup. Specimens 12 and 20 (figs. 8, 7) are two beautifully made cups. Figure 9 illustrates a specimen which closely resembles certain boat-stones, which name it might very well bear. Another fine piece is specimen 19 (fig. 12, Plate 2). It resembles a piece of pottery in miniature. The next piece to which direct reference will be made is specimen 24 (fig. 11). Its convex surface is marked off into quadrants by two grooves which lie at right-angles to each other. Three of the quadrants are decorated with incised lines, which are clearly revealed on the right side of the photograph. The side not seen in the photograph has a circular cavity, 16 mm. deep and about of the same diameter. Specimen 26 is strikingly similar to number 24, but Mr. Neild's piece is somewhat rectangular in outline, as the measurements show. The convex surface is likewise cut into quadrants by grooves lying at right-angles, and all four quadrants are decorated with incised lines. The cavity is of about the same size and shape as the one in number 24. As the map will show, these two pieces were found not so vary far apart, one in Hempstead County, Arkansas, and the other in Claiborne Parish, Louisiana, which is located on the northern border of the state. It is possible that these two pieces were made by the same workman.

Variety III. Seven squarish pieces are placed under this type (Table 3, 35–41). Most of them are thick, and each specimen shows a plane surface or base, quadrangular in form, and a convex surface. Their squarish appearance is well brought out in figure 13, Plate 2. In some pieces the two longest sides are slightly curved (fig. 15). The side view of this same piece shows very clearly the curvature of the convex side (lower side of fig. 14). Two of the pieces have very shallow cavities (numbers 35, 41). The fact that these objects have a base and a convex surface, and are sometimes excavated, places them among the boat-shaped artifacts.

Variety IV. This variety includes five rod-shaped pieces from Arkansas (Table 3, 42–46). The ends may be somewhat pointed (fig. 16, Pl. 2), but are usually blunt (fig. 17). They all have a plane surface or base. The rest of the surface corresponds to the convex surface of the typical boat-stone.

TABLE 3, VARIETIES III–V

Number		County-State	Dimensions	Composition	Owner
35	M–124	W. Carroll, La.	35–35–20–2	Limonite	H. J. Lemley, Hope, Ark.
36	F–84	Hempstead, Ark.	41–34–23–0	Limestone	"
37	B–130	"	42–34–20–0	Syenite	"
38	B–86	Miller, Ark.	49–37–26–0	Igneous rock	"
39	B–195	Yell, Ark.	51–32–12–0	Clay ironstone	"
40	B–109	Pope, Ark.	55–27–16–0	Elaeolite-syenite	"
41	B–81	Hempstead, Ark.	62–35–17–1	Syenite	"
42	B–129	Hempstead, Ark.	59–25–21–0	Spongy chert	H. J. Lemley, Hope, Ark.
43		Yell, Ark.	72–23–20–0	Clay ironstone	W. I. Jenkins, Tyler, Tex.
44	B–190	Chicot, Ark.	75–25–21–0	Gray sandstone	H. J. Lemley, Hope, Ark.
45	B–83	Mississippi, Ark.	80–21–17–0	Igneous rock	"
46		Yell, Ark.	80–25–15–0	Clay ironstone	W. I. Jenkins, Tyler, Ark.
47	B–203	Nevada, Ark.	57–24–15–0	Sandstone	H. J. Lemley, Hope, Ark.
48	B–159	Hempstead, Ark.	62–30–15–2	Mica. sandstone	"
49	B–139	Scott, Ark.	66–15– 9–0	Slate	"
50		Claiborne, La.	69–35–19–0	Clay ironstone	E. F. Neild, Shreveport, La.
51	B–170	Hempstead, Ark.	74–34–15–1	Brown sandstone	H. J. Lemley, Hope, Ark.
52	CP–3362	Williamson, Tex.	77–27– 9–0	Sandstone	Anth. Mus. U. T., Austin, Tex.
53	B–166	Hempstead, Ark.	80–31–10–0	Quartz. sandstone?	H. J. Lemley, Hope, Ark.
54	B–162	Nevada, Ark.	84–29–12–0	Trachyte	"
55	B–194	Yell, Ark.	85–17–17–0	Clay ironstone	"
56		Kerr, Tex.	95–20– 5–0	Shale	W. I. Jenkins, Tyler, Tex.
57	B–49	Hempstead, Ark.	99–28–11–0	Clay ironstone	H. J. Lemley, Hope, Ark.

Variety V. These artifacts are more or less rectangular, with an average length of about three times the average width (Table 3, 47–57). The individual piece is flat and thin, and has a distinct base and a convex surface (fig. 19, Pl. 3). Only two of the eleven pieces have hollowed out bases (48, 51), but in each case the cavity is very shallow (fig. 20). Figure 18 illustrates a very interesting specimen from Williamson County, Texas. It was found by the Department of Anthropology, The University of Texas, during the excavation of a large burnt rock mound located at the town of Cedar Park. The interesting feature of this piece is the notching at the ends. Note that the notches extend for a short distance along the convex surface.

Variety VI. A group of sixteen metate-shaped specimens is placed under this type. They are all strikingly similiar in appearance and structure. Five of them are illustrated in figures 21 to 25, Plate 3. They are usually not polished, but show much evidence of the pecking process over the entire convex surface and on the edges of the base (fig. 21). Occasionally, a piece is found which is polished and which reveals much evidence of care in its production (fig. 24) . Figure 23 shows a diamond-shaped pattern of criss-crossed incised lines.

Variety VII. This variety includes seven specimens (Table 4, 74–80) which are characterized by blunt ends, considerable depth, and a peculiarly made cavity. A typical specimen is shown in figure 28, Plate 4. The cavity is deep and v-shaped and comes to a point at the center of its bottom. Figure 27 illustrates one from Louisiana which has a hole that was not made by drilling. The excavation had been carried to such a depth at the center point that the thin wall was broken through, either at the time the piece was made, or else subsequently through use. Figure 26 shows another of these pieces which has a drilled perforation at the center. This hole was drilled from the inside.

Variety VIII. Ten pieces are classed under Variety VIII (Table 5, 81–90). These are small, semiovoid or beetle-like objects, with the base usually excavated to form a cavity, and sometimes with notches at the ends. Eight of the ten are displayed in figures 29 to 36, Plate 4. Three of these may be singled out for comment.

TABLE 4, VARIETIES VI, VII

Number		County-State	Dimensions	Composition	Owner
58	B–77	Hempstead, Ark.	48–33–13–7	Clay ironstone	H. J. Lemley, Hope, Ark.
59	B–30	"	51–31–18–12	Sandstone	"
60	B–123	Yell, Ark.	59–35–14–6	Diabase	"
61	B–54	Hempstead, Ark.	63–30–15–8	Sandstone	"
62	B–68	Nevada, Ark.	69–44–20–16	Quartz. sandstone	"
63		Bell, Tex.	73–45–15–	Sandstone	Anth. Mus., U. T., Austin, Tex.
64	Bo–19	Natchitoches, La.	76–37–20–9	Sandstone	L. S. N. C., Natchitoches, La.
65		Comal, Tex.	79–38–19–___	Sandstone	A. M. Fiedler, New Braunfels, Tex.
66		Yell, Ark.	88–35–22–7	Novaculite	W. I. Jenkins, Tyler, Tex.
67	B–115	Hot Springs, Ark.	93–42–19–7	Coarse chert	H. J. Lemley, Hope, Ark.
68	B–101	Garland, Ark.	98–46–17–3	Flint	"
69		Milam, Tex.	Broken	Limestone	Charles Nabours, Cameron, Tex.
70		Navarro, Tex.	"	Sandstone	Sam N. Horne, Waco, Tex.
71		Somervell, Tex.	"	Sandstone	Mr. Bessent, Junction, Tex.
72		Collin, Tex.	"	Limestone	Lester Wilson, Wylie, Tex.
73		"	"	Ferrug. sandstone	"
74	B–112	Hempstead, Ark.	60–30–18–8	Impure chert	H. J. Lemley, Hope, Ark.
75	B–177	Nevada, Ark.	63–32–17–10	Sandstone	"
76	B–163	Hempstead, Ark.	67–31–26–9	"	"
77	B–29	Scott, Ark.	68–32–23–10	Sandstone	"
78	B–189	Montgomery, Ark.	70–34–20–17	Porous chert	"
79	Bo–16	Natchitoches, La.	88–32–24–18	Sandstone	L. S. N. C., Natchitoches, La.
80		Milam, Tex.	93–33–33–___	"	Chas. Nabours, Cameron, Tex.

The convex surface of number 88 looks very much like that of a hard-boiled egg from which a part of the shell has been broken away (fig. 30). It is composed of clay ironstone, and presents a condition which is frequently seen in artifacts of this composition. Apparently, under the action of water the iron comes to the surface and forms a crust or shell, which has a tendency to crack and scale off. Number 90 is a very beautiful specimen from Milam County, Texas (fig. 36). It is composed of crystal quartz and has a very small notch at each end (scarcely visible in the photograph). The outer surface is not polished, but is smooth and has the appearance of ground glass. The surface of the cavity is pitted as a result of the pecking process. Number 85 is a very remarkable piece (fig. 29), which may represent the effigy of a beetle. It will be considered more fully in a later section.

Variety IX. This variety consists of only three specimens which are somewhat similar to those of the preceding type, but with the length always more than twice the width (Table 5, 91–93). The general form of these objects is well brought out in figures 37 and 38. Number 93 has a groove-like cavity which terminates in notches at the ends (fig. 37).

Variety X. This variety is represented by ten pieces (Table 5, 94–103). These are short, deep, relatively heavy objects, with the base usually unexcavated. Four of them are shown in figures 39 to 42, Plate 5. Number 97 may be taken as typical of the group (fig. 40). Number 96 is a finely made piece, and has a narrow, shallow, groove-like cavity (fig. 41). Number 102 represents a specimen with an unfinished cavity (fig. 42). This is indicated by the fact that the pecking process was not completed, for the pecked region covers only a narrow area, which runs diagonally across the base.

Variety XI. A large group of nineteen specimens, all from Arkansas, belong to this variety (Table 6, 104–122). They are elongated objects, with the base unexcavated, with the exception of a single piece (119), which has a very shallow groove-like cavity. Number 110 may be cited as an example of the type (fig. 44). The form of this piece is very symmetrical, and this with

TABLE 5, VARIETIES VIII–X

Number		County-State	Dimensions	Composition	Owner
81	B–132	Scott, Ark.	37–24–13–3	Translucent quartz	H. J. Lemley, Hope, Ark.
82	B–48	Lafayette, Ark.	40–26–16–3	Sandstone	"
83	B–98	Hempstead, Ark.	40–28–27–4	"	"
84	B–87	"	41–28–10–4	Reddish flint	"
85	B–153	"	44–30–11–1	Trachyte	"
86	B–76	Sevier, Ark.	46–24–14–2	Diabase	"
87	B–122	Hempstead, Ark.	47–30–19–8	Clear quartz	"
88	B–192	Yell, Ark.	52–37–24–0	Clay ironstone	"
89	G–153	W. Carroll, La.	60–40–20–0	"	"
90		Milam, Tex.	60–32–28–8	Clear quartz	Mrs. A. Kruse, Cameron, Tex.
91	B–188	Hempstead, Ark.	55–24–10–2	Quartzite	H. J. Lemley, Hope, Ark.
92	B–14	Yell, Ark.	58–26–12–4	Trachyte	"
93	B–31	Hempstead, Ark.	59–27–16–2	Syenite	"
94	F–29	Hempstead, Ark.	40–34–30–0	?	H. J. Lemley, Hope, Ark.
95	B–145	Yell, Ark.	42–25–20–0	Siliceous slate	"
96	B–22	Johnson, Ark.	50–36–23–1	Quartz. sandstone?	"
97	B–144	Pulaski, Ark.	50–26–23–0	Banded chert	"
98	B–21	W. Carroll, La.	60–33–26–0	Quartzite	"
99	B–167	Howard, Ark.	63–43–25–0	Clear quartz	"
100		Morris, Texas	64–39–19–0	Clay ironstone	P. H. Walser, Bryan, Tex.
101	B–158	Hempstead, Ark.	65–30–25–5	Quartz. sandstone?	H. J. Lemley, Hope, Ark.
102	B–138	Nevada, Ark.	67–40–26–2	Quartz. sandstone?	"
103	B–13	Yell, Ark.	73–35–21–0	Syenite	"

its maroon color, mottled with splotches of a golden hue, makes it an object of real art. In many of the specimens the ends are square, and the convex side is loaf-shaped (fig. 43).

Variety XII. This variety represents one of the most common forms of excavated, non-perforated, boat-stones that has been reported from this area. There is considerable variation in size among the fourteen specimens listed, with the length varying from 62 to 161 millimeters (Table 7, 123–136). Nevertheless, they are all very similarly constructed. The two from Texas (124, 128) that are illustrated in figures 45 and 46 are typical of the smaller members of the group. Number 128 (fig. 46) has the ends notched, and one other piece (127) also has notched ends. The curved side of these pieces is not unlike that of the pieces listed under the preceding variety.

Perhaps a better idea of this variety can be gained by referring to figures 47 and 48, Plate 6, of specimens 134 and 135, respectively. In making the negatives, these two pieces were posed so as to reveal the large broad cavity and thin square-like ends. The longest piece belonging to this type is number 136. Indeed, it is the longest boat-stone described in this paper. As a matter of fact, the specimen is but the core of the clay ironstone of which it is composed, for the outer crust or shell has completely scaled off (see account for number 88, under Variety VIII).

Variety XIII. Five boat-stones, all showing the same general structures, are placed under this variety (Table 7, 137–141). They have these points in common, absence of true keel, deep notches at ends, and curved sides (figs. 49–53, Plate 6). The base is excavated in all except 137 (fig. 49). Specimen 139 has a deep groove running the full length of the convex surface and terminating in the notches (fig. 51). This piece also has a cavity on the reverse or base side. Number 141 shows a very fine example of the groove-like type of cavity on the base (fig. 53).

Variety XIV. There are four distinctly canoe-shaped objects (figs. 54–56, Plate 7) included under this variety (Table 7, 142–145). All four are beautifully made of choice materials, and polished. Three are composed of the velvet-black touchstone

TABLE 6, VARIETY XI

Number		County-State	Dimensions	Composition	Owner
104	B–102	Hempstead, Ark.	65–31–14–0	Quartzit. sandstone?	H. J. Lemley, Hope, Ark.
105		Yell, Ark.	67–27–25–0	Hornblend syenite	R. W. Aldrich, Austin, Tex.
106	B–161	Hempstead, Ark.	68–32–13–0	Igneous rock	H. J. Lemley, Hope, Ark.
107	B–47	Montgomery, Ark.	70–41–18–0	Impure chert	"
108	B–58	Faulkner, Ark.	71–32–17–0	Sandstone	"
109	B–56	Pope, Ark.	73–23–18–0	Diabase	"
110	B–105	Yell, Ark.	73–33–18–0	Mottled Clay ironstone	"
111		"	76–30–25–0	Sandstone	W. I. Jenkins, Tyler, Tex.
112	B–38	Scott, Ark.	78–34–19–0	White chert	H. J. Lemley, Hope, Ark.
113		Yell, Ark.	81–34–19–0	Black slate	R. W. Aldrich, Austin, Tex.
114	B–18	Hempstead, Ark.	82–30–15–0	Igneous rock	H. J. Lemley, Hope, Ark.
115	B–28	"	85–35–20–0	Translucent quartz	"
116	B–63	Pope, Ark.	85–24–18–0	Arkansas syenite	"
117	B–5	Hempstead, Ark.	98–29–16–0	Trachyte	"
118		Yell, Ark.	100–28–27–0	Impure sandstone	W. I. Jenkins, Teyler, Tex.
119		Hempstead, Ark.	103–37–19–2	Sandstone	P. H. Walser, Bryan, Tex.
120		Garland, Ark.	110–34–25–0	"	W. I. Jenkins, Tyler, Tex.
121	B–46	Hempstead, Ark.	117–34–15–0	Gray slate	H. J. Lemley, Hope, Ark.
122	B–155	"	119–44–30–0	Quartzit. sandstone?	"

(Lydite), and one is made of milky quartzite (fig. 56). These pieces have pointed ends, shallow excavations, and flat "bottoms," upon which they rest in equilibrium when placed on a table with the excavated surface up. In a way, the boat-stones of this variety are intermediate between the varieties described above and those that are to follow. The objects belonging to the former groups have a curved or convex surface and no distinct keel, while those belonging to the latter (with the exception of a few varieties listed at the end of the series) possess a distinct keel, in the sense in which it was defined in the introductory section.

Variety XV. A group of thirteen boat-shaped artifacts of a variety which is entirely different from any so far considered (Table 8, 146–158). The convex surface is replaced by a convex or curved edge, which will be called the keel. This type of design gives to the object very definite sides, which in profile view appear distinctly semicircular (fig. 58, Plate 7). In the typical piece the sides are parallel, and hence the object is like the half of a solid wheel. In some of the specimens the sides are slightly curved (fig. 60), but even in these the keel is of equal width throughout its entire length. Ten of the specimens have unexcavated bases, and three have cavities (fig. 59). Specimen 155 has a well constructed keel groove (fig. 57).

Variety XVI. The nine boat-stones of this variety (Table 8, 159–167) are all heavy pieces with curved sides, square ends, and keels that are broader at the center than toward the ends. Number 164 is a very good example of this variety (fig. 63, Plate 8). The view of the keel (fig. 64) shows the character of that feature of the boat-stone. Figure 62 illustrates a similar but somewhat larger specimen. The largest and heaviest member of the variety is shown in figure 61, Plate 7. It was fashioned from a clay ironstone concretion, and the outer crust of iron is entriely scaled off of the back side and the left end.

Variety XVII. The five specimens included under this variety constitute an unimportant group of poorly constructed artifacts. Three of these have been excavated and two have plane bases. Figure 65 illustrates number 171. The cavity is not well made and has been left in the rough. The keel is rather indistinct, but of equal width throughout the length of the piece.

TABLE 7, VARIETIES XII–XIV

Number		County-State	Dimensions	Composition	Owner
123		Yell, Ark.	62–31–20–10	Syenite	W. I. Jenkins, Tyler, Tex.
124	JMS–1	Wood, Tex.	64–30–20–12	Ironstone	Anth. Mus., U. T., Austin, Tex.
125	293544	Grimes, Tex.	76–31–18–—	Syenite	Field Mus., Chicago, Ill.
126	B–24	Pope, Ark.	80–33–15–7	Trachyte	H. J. Lemley, Hope, Ark.
127	B–6	Lafayette, Ark.	80–34–20–12	Syenite	"
128	Pag. 1	Henderson, Tex.	82–36–25–10	Ironstone con.	Anth. Mus., U. T., Austin, Tex.
129	B–180	Howard, Ark.	90–34–18–3	Trachyte	H. J. Lemley, Hope, Ark.
130	B–201	Nevada, Ark.	91–33–22–8	Sandstone	"
131	B–25	Hempstead, Ark.	92–32–19–15	Trachyte	"
132	B–51	Sevier, Ark.	98–32–17–4	Trachyte	"
133	B–32	Ouachita, Ark.	101–23–15–3	Slate	"
134	B–80	Yell, Ark.	107–35–20–10	Trachyte	"
135	B–126	Hempstead, Ark.	110–34–13–9	Igneous rock	"
136	B–94	"	161–33–22–14	Clay ironstone	"
137	B–116	Yell, Ark.	49–16–11–0	Quartzite	"
138	B–143	"	64–13–8–1	Slate	"
139	B–146	Le Flore, Okla.	67–21–14–4	Quartzite	"
140	B–150	Montgomery, Ark.	81–29–19–5	Foram. limestone	"
141	B–52	Howard, Ark.	101–27–15–4	Diabase	"
142	B–45	Johnson, Ark.	56–7–17–1	Milky quartz	"
143	B–107	Garland, Ark.	76–16–8–3	Lydite	"
144	B–119	"	83–26–16–4	Lydite	"
145	B–106	"	87–17–19–1	Lydite	"

TABLE 8, VARIETIES XV, XVI

Number		County-State	Dimensions	Composition	Owner
146	B–26	Comway, Ark.	42–20–27–0	Arkansas syenite	H. J. Lemley, Hope, Ark.
147	B–96	Johnson, Ark.	52–34–25–0	Clay ironstone	"
148	B–186	Nevada, Ark.	55–21–25–0	Sandstone	"
149	B–20	Hempstead, Ark.	56–20–27–0	Trachyte	"
150	B–66	"	58–23–29–9	Quartz. sandstone	"
151		Yell, Ark.	59–34–39–9	Brown sandstone	P. H. Walser, Bryan, Texas
152	B–202	Nevada, Ark.	60–15–29–0	Sandstone	H. J. Lemley, Hope, Ark.
153	B–74	Lafayette, Ark.	61–32–33–20	Quartz. sandstone	"
154	B–128	Hempstead, Ark.	64–33–30–0	Sandstone	"
155	B–197	Yell, Ark.	67–26–30–0	Micaceous sandstone	"
156		"	69–19–20–0	Gray slate	R. W. Aldrich, Austin, Tex.
157	B–117	Hempstead, Ark.	72–35–30–0	Graywacke	H. J. Lemley, Hope, Ark.
158		Yell, Ark.	Broken	Black chert	W. I. Jenkins, Tyler, Tex.
159	B–64	Hempstead, Ark.	45–24–23–12	Quatrz. sandstone	H. J. Lemley, Hope, Ark.
160	B–103	Richmond, La.	64–22–21–2	Translucent quartz	"
161	Bo–7	Sabine, La.	65–35–25–10	Sandstone	L. S. N. C., Natchitoches, La.
162	B–67	Hempstead, Ark.	66–29–22–7	Quartz. sandstone	H. J. Lemley, Hope, Ark.
163	B–199	Nevada, Ark.	71–37–24–11	Brown quartzite	"
164	B–97	Lafayette, Ark.	74–35–28–16	Quartzite	"
165	B–93	Hempstead, Ark.	98–29–25–21	Clay ironstone	"
166	B–85	"	101–28–24–6	Spongy chert	"
167	B–90	"	123–49–50–16	Clay ironstone con.	"

Variety XVIII. From the standpoint of design and workmanship, the better specimens of this variety make unusually attractive objects (Table 9, 173–177). They have curved sides, square ends, large cavities, and keels that are broader at the center than towards the ends. The curved line formed by the juncture of the side and the keel is very clear-cut, and the piece may be said to have a "beveled keel" (Moore, 1910). Three of these boat-stones are shown in figures 66 to 68, Plates 8 and 9. Figure 68 is a view of the keel of specimen 175, and it clearly reveals the nature of the beveled condition.

Variety XIX. The four boat-stones of this variety (Table 9, 178–181) are characterized by having the keel of the same width (or nearly so) as that of the base, and with the sides lying parallel to each other. Three of these have cavities (figs. 69–71, Pl. 9), and one has the base unexcavated (frontispiece, C). Number 180 was obtained at a depth of about two feet in a burnt rock mound, located near Buda, Travis County, Texas. Observe that the ends are notched (fig. 69). Specimen 179 also has notched ends (fig. 70). The finest of the four pieces is number 181 (fig. 71), which is composed of chloritic quartz and is finely made and polished. The left end, however, is injured.

Variety XX. A group of eight finely wrought boat-stones, reported from Arkansas, Louisiana, and Texas (Table 9, 182–189). All of these pieces have the same general design, which fact warrants placing them under a single variety. Figures 72 to 76, Plate 10, will reveal their main characteristics. Number 185 may be regarded as a typical specimen (fig. 74). The sides are slightly curved and convex, and the flat, broad keel is almost as wide as the base (fig. 75). They are all excavated, and the cavity is deep in all except number 186, which has a relatively shallow hollow, and notches at the ends. The walls of the cavity are fairly thin. The type specimen is the only one which is perforated.

Number 184 (fig. 72) is one of the finest boat-stones reported from Texas. It is made of fine-grained, brown sandstone, and its surface is highly polished. Number 189, composed of rose quartz, is also an elegant artifact. Number 188 (fig. 76) has an unusually deep cavity, but otherwise it clearly belongs to the variety. The

TABLE 9, VARIETIES XVII–XX

Number		County-State	Dimensions	Composition	Owner
168	B–27	Hempstead, Ark.	59–30–23–7	Quartz. sandstone?	H. J. Lemley, Hope, Ark.
169		Yell, Ark.	69–20–28–0	Clay ironstone	W. I. Jenkins, Tyler, Tex.
170	B–92	Sevier, Ark.	73–28–25–5	Graywacke	H. J. Lemley, Hope, Ark.
171	B–50	Scott, Ark.	74–32–24–14	Quartz. sandstone	"
172	B–89	Hempstead, Ark.	80–23–25–0	Micaceous sandstone	"
173	B–32½	Sevier, Ark.	66–23–13–5	Clay ironstone	"
174	B–7	Hempstead, Ark.	79–35–20–9	Syenite	"
175	B–53	Johnson, Ark.	85–28–16–3	"	"
176	B–179	Hempstead, Ark.	93–34–23–14	"	"
177	B–172	Chicot, Ark.	Broken	Quartz. sandstone	"
178	B–165	Pulaski, Ark.	70–28–17–0	Clear quartz	"
179	B–69	? Ark.	72–31–21–5	Trachyte	"
180		Travis, Tex.	88–32–23–10	Dark bedded limestone	J. L. Johnston, Austin, Tex.
181	B–39	Lafayette, Ark.	116–30–17–14	Chloritic quartz	H. J. Lemley, Hope, Ark.
182	Bo–9	Natchitoches, La.	48–30–26–22	Quartz. sandstone	L. S. N. C., Natchitoches, La.
183	28	Rapides, La.	65–29–26–___	Gray sandstone	E. F. Neild, Shreveport, La.
184		Shelby, Tex.	67–30–23–18	Brown sandstone	H. G. Moore, Waco, Tex.
185	B–34	Hempstead, Ark.	77–29–29–18	Trachyte	H. J. Lemley, Hope, Ark.
186	Bo–15	Natchitoches, La.	78–27–29–15	Syenite porphyry	L. S. N. C., Natchitoches, La.
187	B–204	Nevada, Ark.	79–28–21–14	Clay ironstone	H. J. Lemley, Hope, Ark.
188	Bo–2	Lincoln, La.	81–37–33–28	Brown sandstone	L. S. N. C., Natchitoches, La.
189	30	La Salle, La.	85–35–32–___	Rose quartz	E. F. Neild, Shreveport, La.

smallest specimen is number 182, which was found in Natchitoches Parish, Louisiana.

Variety XXI. Three boat-stones from Arkansas (Table 10, 190–192), with broad, beveled keels and with unexcavated bases, constitutes Variety XXI. Figure 77, Plate 11, is a view of the base and side of number 192, and figure 78 illustrates the broad keel of number 191. In their general shape these pieces are related to those of the types which immediately precede and follow it.

Variety XXII. This variety includes a series of fifteen pieces, which belong to the most common of the unexcavated, boat-shaped artifacts of the Gulf Southwest area (Table 10, 193–207). They have a wide distribution over the area, as is shown by the fact that they have been reported from all four states. They have a narrow, beveled keel, which scarcely ever exceeds a width of 10 mm. All of these pieces are well made and are usually well polished.

Four of these objects are displayed in figures 79 to 82, Plate 11. Number 201 (fig. 80) may be taken for the type specimen. The sides are convex and the narrow keel is of about the same width throughout its length. The base is flat in this, as in all of the other pieces except numbers 203 and 205. In these specimens the base is slightly curved from the center toward the edges, creating a shallow depression about 1 mm. deep, which can scarcely be called a cavity. Number 199 (fig. 81) has a keel groove, which terminates in broad notches at the ends. Another specimen with a keel groove is number 206 (fig. 82). Here, however, the groove is broad and shallow and does not show clearly in the photograph.

Variety XXIII. The five boat-stones of this variety (Table 10, 208–212) are all very similar in appearance, and in some respects they resemble those of Variety XXII, especially in having a narrow beveled keel. They are relatively short objects, having notches at the ends, excavated base, and distinctly convex sides (fig. 83). The nature of the beveled keel is well brought out in figure 84.

Variety XXIV. Twelve boat-stones, three from Texas and nine from Arkansas, are placed under this variety (Table 11, 213–224). The better specimens of this group are not surpassed in the symmetry of the design, elegance of finish, and high degree of polish among all of the boat-stones reported from this area. Three of the finest are shown in figures 85 to 89, Plate 12. Three views of

TABLE 10, VARIETIES XXI–XXIII

Number		County-State	Dimensions	Composition	Owner
190	B–73	Faulkner, Ark.	56–25–25–0	Brown sandstone	H. J. Lemley, Hope, Ark.
191	B–171	Sevier, Ark.	65–26–26–0	Trachyte	"
192	B–104	Pope, Ark.	67–26–21–0	Gray syenite	"
193	18/9329	Le Flore, Okla.	64–29–29–0	Limestone	Mus. Amer. Indian, New York
194		Cass, Tex.	69–30–35–0	Green trachyte	B. McGlachlin, Corsicana, Tex.
195		Muskogee? Okla.	70–41–31–0	Blue granite	Harry Lyons, Muskogee, Okla.
196	B–200	Nevada, Ark.	71–31–21–0	Syenite	H. J. Lemley, Hope, Ark.
197	B–23	Johnson, Ark.	72–31–25–0	Trachyte	"
198	B–84	Hempstead, Ark.	74–27–23–0	Quartz. sandstone	"
199	B–59	Scott, Ark.	75–29–28–0	Gray slate	"
200		Claiborne, La.	75–30–28–0	Trachyte	E. F. Neild, Shreveport, La.
201	B–79	Logan, Ark.	78–28–26–0	Trachyte	H. J. Lemley, Hope, Ark.
202	B–78	Scott, Ark.	79–32–22–0	Igneous rock	"
203		Yell, Ark.	79–38–35–1	Slate	P. H. Walser, Bryan, Tex.
204		? Arkansas	83–25–25–0	Greenstone	W. I. Jenkins, Tyler, Tex.
205	B–55	Scott, Ark.	88–32–23–1	Igneous rock	H. J. Lemley, Hope, Ark.
206	B–42	Sevier, Ark.	89–34–29–0	Kieselschiefer	"
207		Yell, Ark.	94–34–21–0	Gray slate	P. H. Walser, Bryan, Tex.
208	B–57	Yell, Ark.	47–28–27–2	Green trachyte	H. J. Lemley, Hope, Ark.
209	B–152	"	60–26–29–10	Green trachyte	"
210	B–182	Lafayette, Ark.	61–24–27–15	Trachyte	"
211	B–193	Nevada, Ark.	66–31–25–15	Porous chert	"
212	B–75	Hempstead, Ark.	Broken	Graywacke	"

number 221 are presented in figures 85, 86, and 87, which show respectively, the side, the excavated base, and the narrow, beveled keel. From these illustrations the reader will be able to recognize the variety.

Numbers 222 (fig. 88) and 218 (fig. 89) are fully as fine as the type specimen, but neither has the ends notched. Number 217 (fig. 90, Pl. 13) is from Cherokee County, Texas, and has notched ends. There is also one other specimen (215) which has notches, but all other specimens of the variety are without this character. Number 219 (fig. 91) is interesting from the point of view of its decorations. It is decorated with heavy, incised lines on each side, and the keel has a poorly constructed groove of very much the same nature as these lines. Number 223 (fig. 92) is from Wood County, Texas. One side is injured, but in its original condition, it was evidently a well made piece.

Variety XXV. A variety consisting of two specialized boat-stones (Table 11, 225, 226). They resemble the boat-stones of the preceding variety in side views and in having the narrow keel. Side and base views of these two pieces are shown in Plate 14. Number 225 is smaller than 226, but in all of their essential structural features they are much alike. These objects are somewhat bowl-shaped in profile views, but, as may be seen from the photographs, they are very narrow, especially the larger one (fig. 97). The cavities are fairly shallow, not exceeding one-third the depth in either piece. The ends are pierced by small perforations, of about 2 mm. diameter, which were drilled outward and slightly downward (figs. 97, 99).

Specimen 225 was a surface find from Travis County, Texas, and number 226 was found in a grave at New Braunfels, Comal County, Texas. Mr. Ed Smith, who made the discovery, states that when first exposed, this boat-stone was lying across the upper part of the chest of a skeleton.

Variety XXVI. This variety is represented by five boat-stones of which four are broken (Table 11, 227–231). They are all from central Texas and all are composed of limestone. Photographs of the only uninjured specimen are not available, and so it will be necessary to illustrate the variety with photographs of some of the fragments. Number 228 is a fragment which represents what appears to be about one-half of the original or unbroken piece. Two

TABLE 11, VARIETIES XXIV–XXVII

Number		County-State	Dimensions	Composition	Owner
213	B–10	Scott, Ark.	53–23–18–13	Clay ironstone	H. J. Lemley, Hope, Ark.
214	B–176	Howard, Ark.	70–24–22–10	Diabase	"
215	B–127	Hempstead, Ark.	85–30–26–8	Clay ironstone	"
216		Wood, Tex.	85–31–26–12	Syenite	P. H. Walser, Bryan, Tex.
217		Cherokee, Tex.	86–30–22–10	Trachyte	J. J. Brown, Austin, Tex.
218	B–41	Hempstead, Ark.	98–33–31–14	Siliceous slate	H. J. Lemley, Hope, Ark.
219	B–169	Montgomery, Ark.	99–35–33–16	Micac. sandstone	"
220	B–95	Nevada, Ark.	102–27–28–12	Diabase	"
221	B–37	Hempstead, Ark.	106–26–30–11	Green sandstone	"
222	B–185	Yell, Ark.	106–30–27–11	Clay ironstone	"
223		Wood, Tex.	111–30–29–12	?	P. H. Walser, Bryan, Tex.
224	B–134	Yell, Ark.	119–34–46–26	Sandstone	H. J. Lemley, Hope, Ark.
225		Travis, Tex.	59–25–30–8	Sandy limestone	Walter Fiegel, Austin, Tex.
226		Comal, Tex.	90–22–30–10	Sandy limestone	Ed. Smith, New Braunfels, Tex.
227		Comal, Tex.	111–37–23–___	Limestone	A. Nowotny, New Braunfels, Tex.
228	6881	Milam, Tex.	Broken	Sandy limestone	Author's Col., Austin, Tex.
229		Bell, Tex.	"	Fos. limestone	Anth. Mus., U. T., Austin, Tex.
230		"	"	Limestone	"
231		"	"	Fos. limestone	Ralph Moore, Temple, Tex.
232		Milam, Tex.	56–25–26–9	Trans. quartz	J. B. White, Cameron, Tex.
233		Hempstead, Ark.	61–30–33–15	Sandstone	P. H. Walser, Bryan, Tex.
234	B–135	Yell, Ark.	76–30–39–23	Graywacke	H. J. Lemley, Hope, Ark.
235		"	80–22–43–20	Clay ironstone	R. W. Aldrich, Austin, Tex.
236	B–36	Scott, Ark.	81–31–38–26	Dense hematite	H. J. Lemley, Hope, Ark.
237	B–121	Montgomery, Ark.	83–34–39–23	Graywacke	"

views of this fragment are shown in figures 93 and 94, of the base and keel sides, respectively. None of the five boat-stones is very deep. This broken half is only 20 mm. deep at the level of the broken edge. The end is thin, coming down almost to a feather edge.

All four fragments, as well as the uninjured specimen, show notches at the ends. The outstanding characteristic of this variety is to be seen in the shape of the beveled keel. Referring to figure 94, it will be observed that the lines where the sides meet the keel start at each corner, and then curve toward the center, finally reducing the width of the keel to about six or seven millimeters. This condition is found in all five pieces. Charles E. Brown (1909) illustrates by outline a boat-stone from Wisconsin which has this same type of keel (his fig. 9, Plate 3). The chief variation found among the different members of this variety is the width of the end. In some pieces it is not more than one-half as wide as the one shown in figure 94 (fig. 95).

Variety XXVII. A very interesting variety, consisting of five boat-stones from Arkansas and one from Texas (Table 11, 232–237). Six photographic illustrations of four of these pieces are shown in Plate 15. In side view, this variety of boat-stone is semicircular (figs. 100–103), with convex sides, and with a broad keel. All are excavated, and usually have a very deep cavity. The object resembles the half of a thick biconvex lens. This resemblance is especially striking when the piece is viewed from the keel edge (fig. 105). The base view of this same piece (number 236) shows the deep cavity and the thin walls (fig. 104). The single piece from Texas came from Milam County, and is composed of translucent quartz. Its main difference from the specimens reported from Arkansas is in the depth of its cavity, which is only 9 mm. deep. This variety also occurs in Oklahoma. Mr. L. B. Smith of Braggs, Oklahoma, recently sent photographs and measurements of two specimens from Muskogee County which are very similar to this variety.

Variety XXVIII. Thirteen boat-stones, having a wide distribution, are included under this variety (Table 12, 238–250). They have been reported from Arkansas, Louisiana, and Texas. Number 244 will be used as the type (fig. 106, Pl. 16). Viewed from the side, this piece resembles those of Variety XXVII, but on account of the

length of the base, it is not quite semicircular. Moreover, the keel is narrow and usually is not more than 6 mm. wide (fig. 109), and the walls of the cavity are thick.

The main variable character found among the several specimens belonging to this variety is the depth of the excavation on the base. Number 241, which is composed of clear or crystal quartz, has a distinctly groove-shaped cavity which is but 4 mm. deep (frontispiece, B). Number 242, also made of clear quartz, has a narrow groove on the base which is only 2 mm. deep at the deepest point (frontispiece, A). There is one piece in the group in which the base is entirely unexcavated. This is number 239. It has, however, a keel groove, and a well worn, transverse notch at the center of the keel (fig. 107). No such notch has been seen on any of the large number of boat-stones examined from the Gulf Southwest region.

Variety XXIX. Two strikingly similar boat-stones, which show certain features not observed in any other specimens, are included under Variety XXIX (Table 12, 251, 252). Number 252 will illustrate the type (fig. 112, Pl. 17). The sides are convex, the keel very narrow, ends notched, and the cavity large with thin shell-like walls. This boat-stone is almost black in color, and is composed of dark, greenish black, porphyritic igneous rock. It was ploughed up on a mound near Yancy, Arkansas, on the Hempstead-Howard County line (Major Johnson place).

Number 251 is composed of fine-grained diabase of a grayish green color. It was found in 1935 by Mr. Lemley while excavating mound "D" on the Crenshaw place, Miller County, Arkansas. In the account of this discovery at the Crenshaw place, he makes the following statement in listing the artifacts discovered, "At a depth of 3′, a deeply hollowed-out boat-stone of greenish gray stone, probably sianite, notched at the ends; almost in touch with the hollow of the boat-stone was an oval pebble which readily nests in the stone" (Lemley 1936, pp. 33–34).

This boat-stone and the pebble are shown in figure 110, and a view of the keel is seen in figure 111. The only difference observed between these two boat-stones is in the character of the notches. In number 252 the notch at either end passes directly into a v-shaped groove, which extends for 28 mm. along the keel. Specimen 252

TABLE 12, VARIETIES XXVIII–XXX

Number		County-State	Dimensions	Composition	Owner
238		Wood, Tex.	69–28–30–4	Buff sandstone	P. H. Walser, Bryan, Tex.
239	B–178	Yell, Ark.	72–24–31–0	Quartzite-quartz	H. J. Lemley, Hope, Ark.
240	B–11	Clark, Ark.	81–29–38–10	Quartz. sandstone	"
241	B–168	Montgomery, Ark.	81–21–35–4	Clear quartz	"
242	B–164	Howard, Ark.	82–20–39–2	Clear quartz	"
243	33	Webster, La.	85–33–32– ...	Sandstone	E. F. Neild, Shreveport, La.
244	4373	McLennan, Tex.	89–35–55–35	Fos. limestone	Baylor Museum, Waco, Tex.
245		Yell, Ark.	92–30–35–10	Novaculite	W. I. Jenkins, Tyler, Tex.
246	21	Caddo, La.	90–30–43– ...	Syenite	E. F. Neild, Shreveport, La.
247		Yell, Ark.	Broken	Gray sandstone	W. I. Jenkins, Tyler, Tex.
248		Travis, Tex.	"	Limestone	Walter Fiegel, Austin, Tex.
249		McLennan, Tex.	"	Limestone	Frank Bryan, Waco, Tex.
250		"	"	Limestone	"
251	B–181	Miller, Ark.	80–35–40–34	Fine-grained Diabase	H. J. Lemley, Hope, Ark.
252	B–8	Howard, Ark.	89–31–43–28	Porphyritic Ig. St.	"
253	B–156	Pike, Ark.	69–23–25–10	Slate ?	"
254	B–33	Yell, Ark.	78–23–39–15	Clay ironstone	"
255	B–82	Pope, Ark.	82–26–44–16	Graywacke	"
256	B–149	Logan, Ark.	91–29–57–40	Clay ironstone	"
257	B–12	St. Francis, Ark.	100–25–42–23	Graywacke	"
258		Hunt, Tex.	Broken	Limestone	D. R. Waddle, Greenville, Tex.

therefore has an incomplete keel groove, while number 251 has only the notches.

Variety XXX. Five boat-stones from Arkansas and one broken specimen from Texas constitute this variety (Table 12, 253–258). These pieces are narrow and deep and all have the keel grooved. Number 256 represents a typical specimen. It is made of clay ironstone, banded with light brown and purple bands (fig. 113, Pl. 18). The banded condition shows much more clearly in the view of the keel (fig. 114). Number 254 is of the same composition, but it is narrower, more triangular in side view, and has a much shallower cavity. Figure 116 of number 257 shows the extreme form of this variety. The sides are almost parallel, and the piece is distinctly triangular, thus showing a resemblance to those of the next variety.

The keel groove is the outstanding characteristic of these hollow boat-stones. The groove is in the form of a v-shaped excavation, and it would appear that it was intended to receive a thin cord or thread.

Variety XXXI. A group of twenty-two pieces from Arkansas, Oklahoma, and Texas are listed under this variety (Table 13, 259–280). This group of artifacts really should be divided into two sub-varieties, one representing the grooved bar-like forms, and the other consisting of the flat triangular pieces with keel grooves. But inasmuch as the two grade imperceptably into each other, we shall consider them together. All of the specimens listed in Table 13 were in the laboratory at one time, making it possible to arrange them into a series showing every gradation from the simplest to the most highly developed pieces. The group as a whole undoubtedly represents the most highly specialized of all the boat-shaped artifacts.

The probable beginnings of the bar forms are to be found in some such piece as the rather crude specimen illustrated in figure 120, Plate 19. There then follows in the series pieces that are much better finished, but still do not have a groove extending along the length of the convex surface (numbers 261, 262). Then comes a broken fragment (number 263) with a groove that probably extended the full length of the uninjured piece. The series culminates in a grooved bar specimen which shows the highest type of craftsmanship (fig. 122).

TABLE 13, VARIETY XXXI

Number		County-State	Dimensions	Composition	Owner
259	B–2	? Ark.	46–26–12–0	Clay ironstone	H. J. Lemley, Hope, Ark.
260	B–91	Hempstead? Ark.	69–19–15–0	Sandstone	"
261	B–196	Yell, Ark.	121–23–19–0	Slate	"
262		LeFlore, Okla.	121–18–26–0	Slate	Lester Wilson, Wylie, Tex.
263		"	Broken	Slate	"
264	B–44	Garland, Ark.	141–25–18–0	Siliceous slate	H. J. Lemley, Hope, Ark.
265	B–198	Yell, Ark.	131–21–28–0	Clay ironstone	"
266	B–1	Polk, Ark.	120–20–31–0	"	"
267	B–88	Hempstead, Ark.	95–11–23–0	Graywacke	"
268	B–100	"	122–13–37–0	Clay ironstone	"
269	B–110	Garland, Ark.	39–9–18–0	Slate	"
270	B–35	Sevier, Ark.	64–12–28–0	Dense hematite	"
271	B–111	Yell, Ark.	69–13–30–0	Slate ?	"
272	B–154	"	70–14–29–0	Dense hematite	"
273	B–16	"	74–16–30–0	Clay ironstone	"
274	B–118	"	75–20–35–0	Foram. limestone	"
275	B–148	"	78–14–30–0	Clay ironstone	"
276		Garland, Ark.	80–11–34–0	Hard shale	W. I. Jenkins, Tyler, Tex.
277	RC–209	Coryell, Tex.	84–8–30–0	Red limestone	Anth. Mus., U. T., Austin, Tex.
278	CP–2882	Williamson, Tex.	89–12–36–2	Oolitic limestone	"
279		Garland, Ark.	90–15–50–0	Sanidine porphyry	W. I. Jenkins, Tyler, Tex.
280	B–147	Yell, Ark.	95–14–33–0	Clay ironstone	H. J. Lemley, Hope, Ark.

There are several specimens which show the transition from the grooved bar to the high thin forms. Number 265 is not unlike number 264, but it is somewhat narrower at the base and is distinctly higher at the center (28 mm. as compared to 18 mm. for 264). Number 266 shows still another step in the transformation, in that it is higher at the center (31 mm.), and in number 268 (fig. 117) the change is complete. If we are correct in this interpretation, then the change from the bar to the thin flat type consisted in reducing the width of the base and increasing the height of the specimen.

There is a series of ten or twelve finely wrought pieces among the thin flat forms, and only a few of the crude type. Four of the finer objects are illustrated in figures 123 to 128, Plate 20. Some of these have the edges of the base parallel, some have slightly curved sides, and some have decidedly convex sides. In all of them the convex edge is hollowed out to form a v-shaped cavity, the equivalent of the keel groove (figs. 127, 128).

Among the crude forms, three may be cited. Number 267 (fig. 121) is made from a flat piece of graywacke, one edge being ground flat to form a base, and the other, the convex edge, excavated to form a groove. Number 278 was made from a flat piece of limestone. The convex edge has a groove which continues across the truncated ends (fig. 118). The base is slightly excavated to form a cavity which is little more than a "scratch." Number 279, which is similar to 278, is not unlike one figured by Moorehead from Arkansas (1917, fig. 223). Number 277, while well worked, is still left with an incomplete groove (fig. 119).

Perhaps the descriptions just given will reveal to the reader why these pieces have been classed with the boat-shaped artifacts, but, by way of emphasis, it may be pointed out that their side views, flat bases, and keel grooves, are all similar to the corresponding parts of the true boat-shaped stones.

Variety XXXII. This was the most commonly reported variety of boat-stone, with a total of twenty-four specimens, of which twelve were from Texas, eight from Louisiana, and four from Arkansas (Table 14, 281–304). It has two diagnostic features, a "transverse keel" and triangular sides which slope inward, making the width of the base less than the length of the keel. A series of ten of these artifacts are shown in Plate 21.

TABLE 14, VARIETY XXXII

Number		County-State	Dimensions	Composition	Owner
281	Bo–10	Natchitoches, La.	46–32–21–9	Cloudy quartz	L. S. N. C., Natchitoches, La.
282		Williamson, Tex.	52–40–24–2	Clear quartz	F. Hausman, Austin, Tex.
283		Coryell, Tex.	54–40–21–10	Cloudy quartz	Frank Watt, Waco, Tex.
284		Aransas, Tex.	55–32–25–3	Soapstone ?	Witte Mus., San Antonio, Tex.
285		Polk, Tex.	55–34–24–7	Quartzite	Houston Mus., Houston, Tex.
286		Bastrop, Tex.	56–40–19–10	Quartz conglom.	J. Jensen, Butler, Tex.
287		Tyler, Tex.	58–39–22–10	Red granite	J. T. Collier, Houston, Tex.
288	Bo–18	De Soto, La.	58–44–19–15	Quartzite	L. S. N. C., Natchitoches, La.
289	6881	? , Texas	58–40–22–7	Quartzite	Author's Col., Austin, Tex.
290	B–3	Garland, Ark.	58–34–20–0	Hematite	H. J. Lemley, Hope, Ark.
291		Williamson, Tex.	47–32–22–11	Andesite	Mrs. Cluck, Cedar Park, Tex.
292		Falls, Tex.	63–40–24–8	Clear quartz	F. P. Goddard, Marlin, Tex.
293	B–4	Scott, Ark.	64–42–12–0	Black slate	H. J. Lemley, Hope, Ark.
294		Comal, Tex.	67–42–24–12	Elaeolite-syenite	K. Amelung, San Antonio, Tex.
295	31	Webster, La.	67–35–22–10	Granite	E. F. Neild, Shreveport, La.
296	32	La Salle, La.	72–44–25–15	Syenite	"
297	Bo–14	Catahoula, La.	72–40–27–13	Sandstone	L. S. N. C., Natchitoches, La.
298	Bo–5	Natchitoches, La.	75–42–34–8	Sandstone	"
299		Lampasas, Tex.	75–47–30–6	Limestone	C. Taliaferro, Lampasas, Tex.
300		Bell, Tex.	87–55–15–9	Sandstone	L. A. Chancellor, Killeen, Tex.
301	Bo–6	Rapides, La.	96–36–29–14	Spongy sandstone	L. S. N. C., Natchitoches, La.
302	B–133	Garland, Ark.	97–45–29–19	Vein quartz	H. J. Lemley, Hope, Ark.
303	Bo–17	? , Louisiana	149–29–22–7	Diabase	L. S. N. C., Natchitoches, La.
304	Bo–1	? , Louisiana	Broken	Clear quartz	"

So similar are these boat-stones to each other that any one of fully fifteen could be employed as the type. Number 286 (fig. 130) will be used for the detailed description. This piece was found about twelve years ago in a garden located on a camp site, about one mile northeast of Butler, Bastrop County, Texas. When examined from the excavated base, the upper edges of the side are seen to lie parallel to each other and to slope inward on approaching the base, so that the base is somewhat narrower than the convex or keel side. The ends are curved and the sides are more or less triangular (fig. 130). Each half of the convex surface is curved both toward its lateral edges and toward the end. These two curved halves meet at the middle to form a keel-like ridge or seam, which lies at right-angles to the long axis of the piece. This boat-stone is composed of quartz conglomerate of a milky to gray color, interspread with fragments of jasper, and stained slightly pinkish by iron oxide.

All of these boat-stones are excavated except two, one of which is shown in figure 132. The other illustrations on Plate 21 were selected with the view of showing specimens which vary from the type piece. Figure 133 (number 302) shows one of the variants in which the cavity is unusually large and the sides are slightly "compressed" at the center. Number 301 (fig. 135) also has compressed sides, and in addition, has the keel ridge eliminated by the grinding process.

Numbers 299 and 300 (fig. 134) represent another variation. These boat-stones are wide, but otherwise they show the general features of the type. Number 303, illustrated in figure 138, is a peculiar piece of unusual length. It is doubtful whether this specimen should be included under Variety XXXII, even though it does have the characteristic transverse keel and sloping sides.

Variety XXXIII. In this, and in the four varieties that follow, are listed nineteen boat-stones which have certain points in common, but which fall into five easily recognized varieties. They are all perforated with at least two holes, do not have a distinct keel, and have a base which is more or less "dished."

Variety XXXIII is illustrated by six photographs in Plate 22. The striking characteristic of this type is the circular cavity with

rounded bottom, located at the center of the base. The two perforations always lie outside the cavity and toward the ends. The base is dished, that is, it is curved from the edges toward the middle throughout the full length of the piece. This feature is clearly brought out in figures 139 and 141.

Number 309 (fig. 143) was found about forty years ago five miles west of Pittsburg, Camp County, Texas. When discovered one end was missing (lower in figure) and the broken edge has been reworked and decorated with incised notches. The entire convex surface is also decorated with fine incised lines and small pits. Part of these are visible in the upper right-hand corner of the photograph.

Five pieces of this variety have been reported from the Gulf Southwest area (Table 15, 305–309), and two have been illustrated in the literature, one from Ohio by Moorehead (1917, p. 75, fig. 50) and the other from Mississippi by Brown (1926, p. 176, fig. 96). This variety must therefore have a wide distribution.

Variety XXXIV. This variety is also represented by five boat-stones reported from the southwest area (Table 15, 310–314). It is probably true that specimens belonging to this variety have been more frequently illustrated in publications, particularly from the northern states, than those of any other type. An extended description of the variety does not, therefore, seem necessary.

Figures 145–147, Plate 23, show three views of one of these pieces. It was found in a grave in Bell County, Texas, and when discovered was lying about half way down on the left side of the chest of the skeleton (report of E. E. Fry, Killeen, Texas). In these boat-stones the sides and ends all converge to form a blunt knob at the center of the convex surface, and consequently a keel is not present (fig. 145). The base is not quite flat, but slightly dished (fig. 146), and the cavity is large and deep. The large holes have been drilled from the inside, slightly diagonally, at the extreme ends of the cavity (fig. 147).

Variety XXXV. Three boat-stones have been assigned to this variety, all from Texas (Table 15, 315-317). Figures 154 and 155, Plate 24, are side and base views, respectively, of number 317. The characteristics which differentiate this variety from the preceding one are the square instead of curved ends (fig. 155),

TABLE 15, VARIETIES XXXIII–XXXVIII

Number		County-State	Dimensions	Composition	Owner
305		Milam, Tex.	56–35–25–....	Limestone	G. E. Sutton, Yoakum, Tex.
306		Bell, Tex.	69–32–25–...	Brown sandstone	F. W. Smith, Corsicana, Tex.
307	B–62	Lafayette, Ark.	75–37–25–14	Clay ironstone	H. J. Lemley, Hope, Ark.
308	B–70	Hempstead, Ark.	76–36–30–14	Graywacke	"
309	6884	Camp, Tex.	90–44–22–19	Brown sandstone	Author's Col., Austin, Tex.
310	6448	Van Zandt, Tex.	44–29–24–12	Banded limonite	Author's Col., Austin, Tex.
311	6541	Bell, Tex.	66–30–24–14	Limestone	"
312		Burnet, Tex.	80–40–30–21	Limestone	J. L. Johnston, Austin, Tex.
313		Rockwall, Tex.	Broken	Limestone	Lester Wilson, Wylie, Tex.
314		Hempstead, Ark.	"	Reddish limonite	H. J. Lemley, Hope, Ark.
315		Williamson, Tex.	94–35–20–15	Limestone	F. Hausman, Austin, Tex.
316		Bell, Tex.	95–38–25–18	Limestone	N. P. Chaetham, Burnet, Tex.
317		Grayson, Tex.	104–28–31–17	Sandy limestone	Author's Col., Austin, Tex.
318	35	Webster, La.	51–31–35–....	Soapstone ?	E. F. Neild, Shreveport, La.
319	Bo–12	? La.	69–30–18–12	Brown. sandstone	L. S. N. C., Natchitoches, La.
320	B–125	Miller, Ark.	73–36–22–14	Red quartzite	H. J. Lemley, Hope, Ark.
321		Yell, Ark.	87–27–25–15	Sandstone	W. I. Jenkins, Tyler, Tex.
322		Harrison, Tex.	71–39–28–15	Septarian con.	P. H. Walser, Bryan, Tex.
323	B–40	Hempstead, Ark.	84–34–29–16	?	H. J. Lemley, Hope, Ark.
324	JBN–42	Miller, Ark.	34x26x14	Sandy hematite	Ant. Mus., U. T., Austin, Tex.
325		Lincoln, La.	45x30x20	Sandstone	E. F. Neild, Shreveport, La.
326	W–19	Hempstead, Ark.	47x34x30	Green trachyte	H. J. Lemley, Hope, Ark.
327	B–43	Hempstead, Ark.	47x35x5	Clear quartz	"
328	Y–5	Clark, Ark.	48x31x5	Brown quartzite	"
329	W–2	Clark, Ark.	50x33x22	Porous chert	"
330	W–23	Nevada, Ark.	60x29x17	Graywacke	"
331	Co–1	Calcasieu, La.	68x36x23	Quartzite	L. S. N. C., Natchitoches, La.

and the thin v-shaped keel instead of the knob-like convex surface (fig. 154). The type piece was found recently in a grave in Grayson County, Texas, by Mr. W. H. Voelkle, who excavated it at a depth of four feet. It was sent to Mr. A. M. Wilson of Austin, together with the skeleton, two arrow points, and a small metate-like stone, all of which were found in the grave. From the condition of the skeleton and other contents of the grave, the interment probably represents a bundle burial. The boat-stone was shattered during the excavation, but has been repaired. The piece was heavily encrusted with patina when found. Part of this has been removed with acid, but enough remains to be clearly observable in the photograph (fig. 154).

The other two boat-stones are very similar to the type specimen. Number 316 was reported by the owner as having also been found in a grave near Killeen, Bell County, Texas. It was not stated what the exact relation of the piece to the skeleton was, except that it was found on the chest.

Variety XXXVI. Four perforated boat-stones from Arkansas and Louisiana are listed under this variety (Table 15, 318–321). Number 320 will be used as the type. It is illustrated in figures 148 and 149, Plate 23. It has a rounded convex surface, and a very large cavity, and has two small holes. The sides in this and one of the other specimens (321) are decidedly compressed, similary to those of certain pieces listed under Variety XXXII. Number 319 (fig. 150) shows one of the specimens with straight sides. In all four of these boat-stones the perforations are small, and are located nearer the center than is the case of those of Variety XXXV.

Variety XXXVII. The fifth variety of perforated boat-stone includes but two pieces (Table 15, 322–323). A side view of number 323 is given in figure 151, Plate 23, and number 322 is illustrated in figure 153, Plate 24. The diagnostic characteristic of this type is the extreme dished condition of the base, with the resultant open ends of the cavity. The end view (fig. 152) reveals clearly this condition. These boat-stones have two large perforations.

Variety XXXVIII. Eight cone-shaped and circular specimens will be considered under this variety (Table 15, 324–331). The

cones have been reported from various parts of the United States, but here we are interested in those only which have the excavated base, because of their possible relationship to the boat-shaped stones. Five of these are shown in figures 156 to 160, Plates 24 and 25. The one illustrated in figure 156 (number 328) has a shallow cavity of 8 mm. depth. Numbers 325 and 329 (fig. 157) are strikingly similar; both have deep cavities and are truncated at the top (lower side of figure). Number 327 (fig. 158) is a very remarkable cone-shaped piece, with an excavated base. It was made from the sixsided pyramidal end of a quartz crystal. Number 330 (fig. 159) has a very large cavity and the apex is truncated. Another specimen of this same general character, but much finer finished, is number 331 (fig. 160).

Two circular specimens are illustrated in figures 161 and 162, Plate 25. Number 324 is made from sandy hematite and its large perforations are similar to those found in many boat-stones proper (fig. 161). Number 326 is a beautifully wrought object and has two finely drilled holes (fig. 162).

Unclassified Boat-stones. In Table 16 are listed twenty-eight boat-shaped artifacts which could not be classified with any of the varieties described above. They represent broken fragments, several odd pieces, and a few special boat-stones, and two received too late to be classified (358, 359). It does not seem necessary to describe all of these specimens, but comments on some few of them may be of interest to the reader.

Number 334 is one of the most finely wrought pieces in the entire group. It is somewhat cup-like and has a flat "bottom" (fig. 167, Plate 25). Number 331 is another splendidly made piece. It appears bowl-like in side view and has a perforation at either end, about half way down from the base (fig. 165). Number 341 from Taylor County, Texas, is of interest because of its source. It was found near Merkel, which is the farthest point west in Texas from which records of boat-stones have been reported. This record was sent in by Dr. Cyrus N. Ray of Abilene, Texas. Number 356 from Nacogdoches County, Texas, was reported by Mr. H. G. Moore, Waco, Texas, who stated that this broken piece had a single perforation at the center of the cavity.

TABLE 16, UNCLASSIFIED BOAT-STONES

Number		County-State	Dimensions	Composition	Owner
332	B–140	W. Carroll, La.	40–20–5–0	Dense hematite	H. J. Lemley, Hope, Ark.
333		Lampasas, Tex.	45–36–25–0	Limestone	C. B. Taliaferro, Lampasas, Tex.
334	B–120	Garland, Ark.	46–18–24–11	Lydite	H. J. Lemley, Hope, Ark.
335	Bo–11	Beinville, La.	49–37–27–18	Limonite	L. S. N. C., Natchitoches, La.
336	36	Rapides, La.	55–33–25–___	Quartzite	E. F. Neild, Shreveport, La.
337		Searcy, Ark.	58–36–39–20	Banded slate	C. W. Grimes, Tulsa, Okla.
338	6542	Bell, Tex.	65–22–33–3	Limestone	Author's Col., Austin, Tex.
339	JBN–46	Miller, Ark.	Broken	Ironstone	Anth. Mus., U. T., Austin, Tex.
340	B–136	Yell, Ark.	78–28–24–2	Clay ironstone	H. J. Lemley, Hope, Ark.
341		Taylor, Tex.	86–38–37–7	Igneous rock	J. L. McLean, Merkel, Tex.
342		Cass, Tex.	90–36–24–___	Hematite	D. V. Davis, Atlanta, Tex.
343	B–151	Hempstead, Ark.	91–17–15–7	Limonite	H. J. Lemley, Hope, Ark.
344		Comal, Tex.	95–40–27–___	Limestone	A. Nowotny, New Braunfels, Tex.
345	B–137	Hempstead, Ark.	Broken	Trachyte	H. J. Lemley, Hope, Ark.
346		Nacogdoches, Tex.	"	Brown sandstone	F. Alders, Woden, Tex.
347	B–17	Hempstead, Ark.	"	Clay ironstone	H. J. Lemley, Hope, Ark.
348	B–205	W. Carroll, La.	51–34–29–0	Brown sandstone	"
349	B–141	"	53–31–27–0	Brown sandstone	"
350	B–184	Howard, Ark.	73–46–44–16	Brown sandstone	"
351	B–191	Hempstead, Ark.	118–42–60–8	Limestone	"
352	B–187	"	120–63–63–22	Brown sandstone	"
353	B–174	Clark, Ark.	28–13–3–2	Shell	"
354	B–175	"	36–15–20–17	Shell	"
355	B–173	"	60–20–41–37	Shell	"
356	B–9	How-Hemp., Ark.	67–19–6–0	Copper	"
357	18/9113	Le Flore, Ark.		Rock crystal	Mus. Amer. Indian, New York
358		Rusk, Tex.	78–35–19–16	Slate	D. Langston, Mt. Pleasant, Tex.
359		? Louisiana	65–31–18–11	Sandstone	E. Chisum, Monroe, La.

Numbers 348 to 356 represent the special forms, which we shall now describe under their appropriate headings.

a. Unfinished Boat-stones. Various accounts of the methods employed by the Stone Age peoples in the making of their stone implements have appeared in the literature. One of the fullest accounts has been presented by Holmes (1919, pp. 278–367).

Among the artifacts examined in the course of preparing this article are several which exhibit the various steps in the production of the finished object. These show different degrees of the fracturing, the crumbling (pecking), the abrading, and the polishing processes. Four of these are illustrated in Plate 26.

Number 349 (fig. 168) represents a small piece showing the condition at the end of the pecking process, and before the excavation for the cavity had been started. It is in the form of one of the common boat-stones. Number 350 (fig. 169) is in much the same condition, but reveals a more advanced stage in that the excavation for the cavity has been completed. Number 351 (fig. 171) is still another example, although in this case the excavation is apparently incomplete and its surface gives much evidence of weathering. Number 352 (fig. 170) shows the beginning of the abrading or grinding process. This is especially clear in the area about the label, and on the rim of the cavity.

There are many other specimens in the group which reveal a more or less unfinished condition, particularly in the matter of finishing the cavity. Good examples of this can be seen in figures 36, 42, 62, and 129. The most common of this type of incomplete cavity was the failure (international or otherwise) to carry the grinding and polishing to a depth sufficient to remove all traces of the pecking process. Figure 90 shows an excellent example of this type of failure.

b. Boat-shaped Objects of Shell. Not all boat-shaped artifacts were made of stone. In the group from this area there are three objects composed of shell (Table 16, 353–355), which resemble certain types of boat-stones. These were all found in Grave III in the Smith mound, near Okolona, Clark County, Arkansas. They were discovered by Mr. Harry J. Lemley and Mr. Dorris Dickinson in May, 1934.

The largest of these is shown in figure 163, Plate 25. It consists of two semicircular pieces of shell, forming the sides, and four rectangular, slightly curved, pieces which formed the convex edge or keel. The records read as follows, "When found all of the pieces were in place, forming a boat-stone of shell. They came apart when removed. Evidently they had been joined in some way when placed in the grave. . . . This piece was above and to the right of the right shoulder of the skeleton. Several attempts were made to photograph this piece in situ but with poor success." The pieces were probably held together by gum or asphaltum, since there is still present on the several parts an old gum-like substance. For the purpose of making the photograph, the six pieces were put together and held in position by plastic clay.

A second boat-shaped object of shell (354) was found in this same grave (fig. 164). It is smaller but very similar in form to number 355, and there are three instead of four rectangular pieces belonging to the keel. One of the semicircular sides is perforated near the upper left-hand corner. These two shell boat-stones are similar to those described under Variety XXVII.

The third object is a small rectangular piece of shell, 28 by 13 mm., which has a v-shaped groove on what would correspond to the base of a regular boat-stone. It is stated in the records that many other objects of shell were found in this grave.

c. Boat-shaped Objects of Copper. According to Holmes (1919), the Indians mined and utilized the native copper which is found in several places in the country. They especially worked the ancient copper mines of the Lake Superior region, and made from the metals a great variety of ornaments, implements, and objects of faith, which became scattered throughout the United States. Examples of these objects are found as far south as Texas. It is therefore not surprising that a boat-shaped copper piece should have been found in the Gulf Southwest area.

The piece in question is number 356, which was ploughed up, along with number 252, on a mound located on the Major Johnson place, near Yancy on the Hempstead-Howard County line, Arkansas. It was discovered by Mr. George Stewart in 1925. The base views of this piece is illustrated in figure 166, Plate 25. The

reverse side is curved to form a broad flat keel, much like the boat-stones listed under Variety XIX. It has distinct notches which are similar to those of many other boat-stones.

Boat-shaped objects made of copper have been described by Mills (1916), from the Tremper mound, located in Scioto County, Ohio. This writer describes and illustrates three boat-shaped and two cone-like pieces of copper from the mound. Each of the boat-shaped pieces is pierced with two holes. In one the perforations are near the ends, but in each of the other two they are near the center of the piece. The contents found in the cavities of three of these copper objects are of great interest. One contained a quantity of broken quartzite pebbles attached to it through the corrosion of the copper. A second specimen was filled with round quartzite pebbles, about the size of small peas, and white and pink in color. One of the copper cones was also filled with the same types of pebbles. Brown (1909) states that one boat-stone from Wisconsin was made of lead.

d. Effigy Boat-stones. In addition to the copper boat-stones, the Tremper mound yielded many other unusual specimens, but none certainly more interesting than the animal sculptures. Among the very remarkable series of animal sculptures taken from this mound are two boat-shaped effigies, one representing the shell of a beetle, and the other that of a swimming beaver.

The beaver effigy is constructed so as to show only that portion of the animal which would appear above the surface of the water when the animal was swimming. It reveals all of the characteristics of a beaver, even to that of the flat well marked tail. The underside is excavated and two perforations are located near the center of the piece.

The beetle effigy has its upper or convex surface divided into bi-lateral halves by a longitudinal groove running its entire length. There is a transverse depression which further divides it into two halves, each of which resembles the winged portion of a beetle. The raised portions, or wing shields, are decorated by a checkered pattern of incised criss-cross lines. The underside of specimen is similar to the beaver boat-stone, with its large cavity and two perforations.

Willoughby (1922) describes some hollow stone effigies from the Turner group of earthworks, Hamilton County, Ohio, which probably belong to the boat-stone series, although he does not make a direct comparison. In commenting on these pieces he says (p. 71): "Usually made of choice stone. One in Museum is like a beetle. All of them have a cavity upon the underside and seem to have bene fitted over some object. Some have perforations through the top, evidently for attachment." The descriptions of these pieces from Ohio will serve as a basis for the consideration of two sculptured specimens from this region, at least one of which is an effigy.

The first of these, number 88, was referred to above, in the section describing the beetle-like forms of Variety VIII. It is illustrated in figure 29, Plate 4. This specimen was found on the surface at the B. W. Marston place, on Bayou Macon, near Floyd, West Carroll Parish, Louisiana. It is a semiovoid object with a smooth unexcavated base, and with the convex surface marked off into four parts by two grooves lying at right-angles to each other. Each member of the left-hand pair (as seen in the photograph) of areas is marked by a shallow, conical pit. There are two possible ways of interpreting this piece. One is that the grooves were intended to receive cords by which to bind the piece to some other object. On the basis of this interpretation, the conical pits would represent mere decorations.

The second possible interpretation would be that the piece represents an effigy of a beetle, as Mr. A. T. Jackson first suggested. If such an interpretation were made, it would have to be on the same basis as that offered by Mills for the Ohio specimen, namely, that each half represents the posterior or winged portion of the beetle. The pits might then be supposed to represent the "spots" which are present on the wing shields of certain beetles.

The second sculptured boat-stone was found in the Temple mound, located in Le Flore County, Oklahoma. It is now in the "Museum of the American Indian" (#18/9113), New York City. Through the fine courtesy of the Heye Foundation, we are able to show illustrations of this remarkable artifact. Three views of the piece are shown in Plate 27. The upper figure on the plate is reproduced at approximately natural size, and from this the

proportions of the specimen can be judged. In side view it has a certain superficial resemblance to the three-pointed idols of Porto Rico (Fewkes, 1907), but differs from them in the absence of the concoid projection, in having a larger excavation on the base, and being a true bicephalic piece.

Since the museum staff has not as yet published on the specimen, only a brief description of it will be offered, and this is based mainly on the descriptive notes kindly sent to the writer by Mr. Kenneth C. Miller, at the time he forwarded the three photographic prints reproduced on Plate 27. It will be observed that this boat-stone represents a bird-mammal effigy, with the head of an owl on the left and the head of a mammal on the right in the photograph. Better views of the heads are afforded in the two illustrations given below. The piece was carved out of rock crystal, and the entire surface of the stone has the appearance of "ground glass." It is not highly polished, but is very carefully made. The base is excavated to form a cavity 2 and ½ inches long, 11/16 of an inch wide at the center, and ⅜ of an inch deep at the same point. The outline of the cavity is revealed as a translucent area on the lower side of the upper figures. Other details can be made out by the reader by a study of the photographs.

SOME GENERAL CONSIDERATIONS AND DISCUSSION

a. Certain Structural Features of the Boat-stones

In this section certain facts to be found in the tables concerning the structural features of the boat-stones will be brought out and discussed. The first point concerns the size of those artifacts. On the whole, the measurements show that the boat-stones from this area are relatively small objects. Exclusive of broken pieces and the three dimensional cups, they vary from 35 to 161 mm. in length. As calculated from the measurement of 310 specimens, the average length is 73.7 mm. which is slightly less than three inches. In width they vary from 8 to 55 mm., with an average of 30.6 mm., and in depth vary from 5 to 57 mm., with an average of 24.7 mm.

In Table 17 are summarized some facts concerning the main features of these objects. Of the 359 pieces listed in the tables, 256 have the base hollowed out to form a cavity, but in the remaining 103 the base is unexcavated. Most of those belonging to the latter group are from Arkansas. Of the 237 from that state, eighty-six, or more than thirty-six per cent, are unexcavated. Of the specimens reported from Louisiana only about eighteen per cent (7 out of 39) are without the cavity. The number from Oklahoma is too small to be of any significance. Six out of the seventy-seven from Texas are unexcavated. This is less than eight per cent. The point to emphasize then, is the fact that more than a third of the boat-shaped artifacts from the state of Arkansas have the plane or unexcavated base.

It was formerly supposed that those pieces with plane bases, especially if not perforated (Rau, 1876), represented unfinished boat-stones. In 1910 Clarence B. Moore pointed out that it would be untenable to suppose the superb boat-stone of rock crystal, which he had found in a burial in Arkansas, to be an unfinished piece. A large number of these specimens from the Gulf Southwest are beautifully wrought and are quite as fine as any to be found among the excavated class. Moreover, they give every indication of being finished artifacts.

Forty-three boat-stones have notches at the ends (Table 17). This number is exclusive of a few pieces in which the keel groove terminates in notches at the ends of the piece. As was pointed out in the descriptive part of the paper, some of these notches are large, while others are small and fine, and only large enough to receive and hold a fine cord.

There are 162 boat-stones which have some form of keel, and in thirty-four of these the keel has been hollowed out to produce what we have called the keel groove. The probable significance of both the notches and keel groove will be discussed in a later section.

One of the most interesting facts brought out in this study is the surprisingly small number of perforated boat-stones from this region. The statement occurs several times in the early literature that the boat-stones found in the northern states are always perforated, usually with two holes. However, imperforate types were

from time to time reported from that region. For example, Beauchamp (1897) and Charles E. Brown (1909) mention and figure a few such forms from New York and Wisconsin, respectively.

Among the 359 pieces listed in the tables, only thirty-one contain perforations that had been drilled. Sixteen or a majority of these were reported from Texas. Just twelve of the 237 pieces from Arkansas have been drilled. Of the thirty-one pieces, two have one hole each, twenty-seven have two holes each, and two have four holes each (Table 17). The four-hole specimen from Arkansas has been referred to by Jackson (1935), and, as he has pointed out, one of the intended perforations is unfinished.

TABLE 17

State	Ex-cavated	Un-excavated	Notches	Keels	Keel groove	Perforations			Dec-orated
						1	2	4	
Arkansas	151	86	26	108	27	1	10	1	8
Louisiana	32	7	2	19	1	..	3	..	1
Oklahoma	2	4	3	5	2	..	..	..	1
Texas	71	6	12	30	4	1	14	1	1
Totals	256	103	43	162	34	2	27	2	11

Eleven pieces show some from of decoration. This has been done in several ways: 1, by fine incised lines running parallel, or criss-cross; 2, by heavy lines; 3, by rows of dot-like pits, either with or without associated fine lines; 4, incised notches on the edges of the piece; and 5, carvings to produce the effigy forms described above.

Twenty-seven boat-stones were broken when discovered, and are represented by fragments of various sizes. This is not a large number when compared with the percentages of broken pieces found among other classes of artifacts. Twelve of the broken pieces were made of limestone, seven of sandstone, and the eight remaining specimens were composed of seven different kinds of rock. This high proportion of broken limestone and sandstone pieces is probably due to the ease with which these materials fracture, as compared to the harder stones.

b. Composition of the Boat-stones

An analysis of the data on 343 pieces, of which the composition has been determined by Dr. Stenzel, will bring out certain points of general interest. This information has been summarized in Table 18.

In Arkansas, chert, clay ironstone, and sandstone, which account for a total of ninety pieces, are all found in abundance. Another large group is composed of various kinds of igneous rock, such as diabase, sanidine porphyry, syenites, and trachyte. Nine other igneous rock specimens were found to be too fine-grained to permit exact determination without recourse to thin sections. The materials for these fifty-four pieces are all found in an area about Little Rock, Arkansas. The specimens composed of graywacke, lydite, novaculite, or slate, thirty-three in all, are from materials found in the Ouachita Mountain region of western Arkansas. Quartz and quartzite are widely distributed over the entire boat-stone area, and therefore required no further comment. The remaining twenty-four specimens are likewise all composed of materials found in Arkansas, with the exception of the single piece made of copper.

The fourteen sandstone pieces from Louisiana were probably made of local material, since this rock is found in that state, but the diabase, granite, syenite and trachyte specimens are made of materials foreign to the state. The number from Oklahoma is too small to be considered.

The most interesting pieces from Texas are those made of limestone and sandstone. Of the thirty-two limestone pieces, twenty-nine were found in central Texas, where this type of rock is especially abundant. Sandstone is also common, and it is not surprising to find that seventeen specimens were made of this material. The syenite and trachyte pieces probably represent importations. These materials do occur in some form in west Texas, but because of the absence of boat-stones in the western half of the state, it is much more probable that they were derived from Arkansas. This is certainly true for specimen 294, which is composed of elaeolite-syenite, a material found only in a restricted area near Little Rock.

This brief analysis of the composition of the boat-shaped pieces is sufficient to show that a very large majority of them were made of local materials. Evidently, the Indian workman utilized such

materials as were near at hand in manufacturing this particular type of artifact.

TABLE 18. COMPOSITION OF BOAT-STONES

Materials	Arkansas	Louisiana	Oklahoma	Texas	Totals
Andesite	---	---	---	1	1
Chert	15	2	---	---	17
Clay ironstone	32	2	---	1	35
Copper	1	---	---	---	1
Diabase	8	1	---	---	9
Flint	3	2	---	---	5
Granite	---	1	---	1	2
Graywacke	10	---	---	---	10
Hematite	5	1	---	1	7
Igneous rock	9	---	1	1	11
Ironstone	1	1	---	2	4
Limestone	4	1	1	32	38
Limonite	3	2	---	2	7
Lydite	4	---	---	---	4
Novaculite	2	---	---	---	2
Sandstone	43	15	---	17	75
Sanidine porphyry	1	---	---	---	1
Septarian con.	---	---	---	1	1
Shale	2	---	---	1	3
Shell	4	---	---	---	4
Slate	17	---	2	---	19
Syenites	16	2	---	3	21
Trachyte	20	1	---	2	23
Quartz	14	4	1	8	27
Quartzite	9	4	1	2	16
Totals	224	38	6	75	343

c. Geographical Distribution of the Boat-shaped Artifacts

The problem of the geographical distribution of human artifacts is always one of interest and importance. The solution of the question of the distribution of any particular class of artifacts is beset with certain difficulties. In addition to environmental factors which influenced the distribution, there is the difficulty of obtaining reliable records of the discovered specimens. If a perfect map of distribution is to be constructed, all such records should be available. But it is never possible to reach this ideal goal. The best that one can do is to strive to secure as many records as possible, for, in doing this, a good random sample for the area under consideration can usually be obtained.

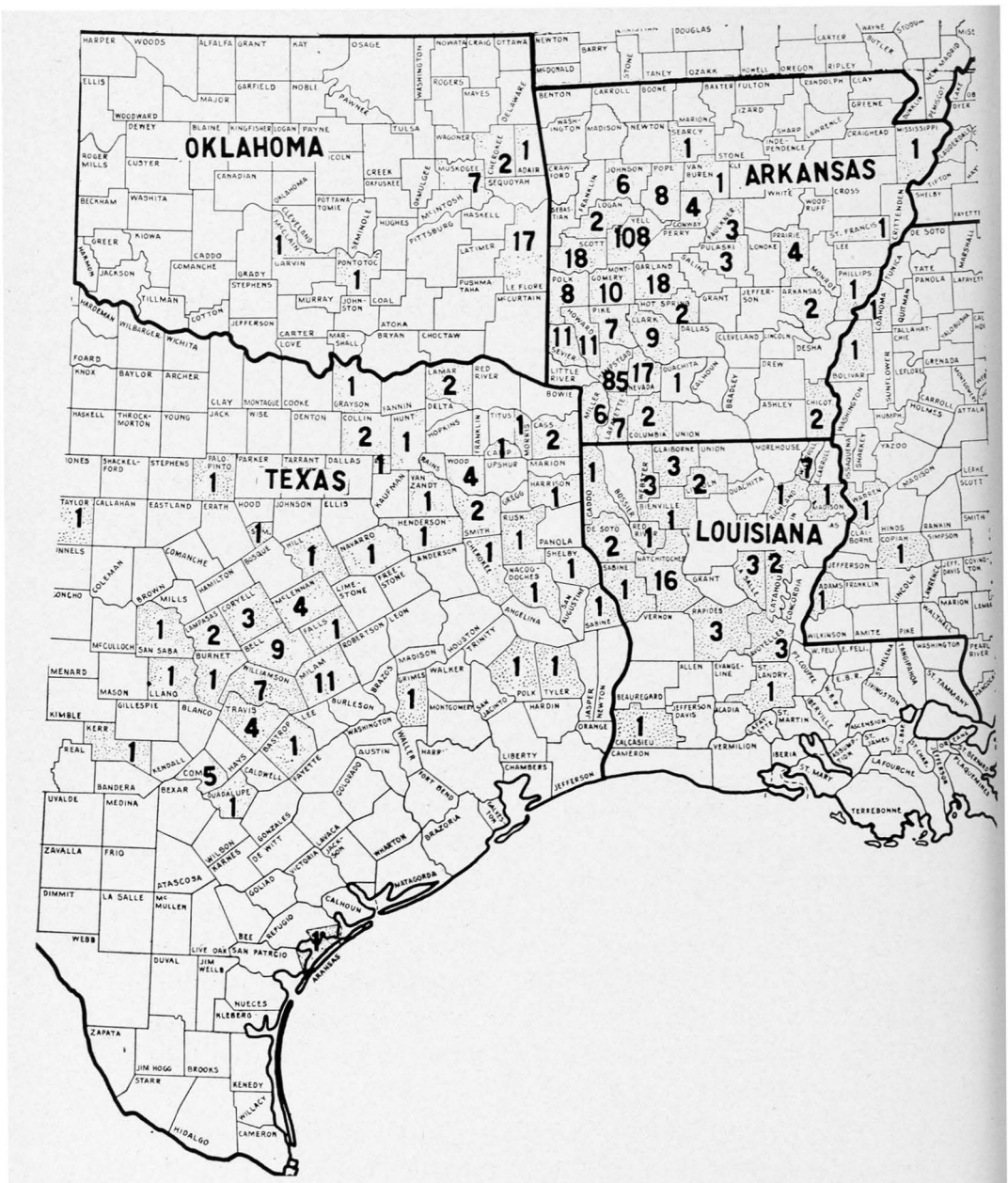
The records of 528 pieces from the four Gulf Southwest states are available for distributional studies. This total is made up of 351 specimens listed in the tables and 177 additional records, which were obtained in part from reliable persons and in part from references in the literature. The county or parish source of all of these artifacts is known. All except two of the total number have been plotted on a base county map, which was kindly furnished by Mr. Harold M. Young, Dallas, Texas, of the United States Department of Commerce.

Text-figure 1 shows the map with all of the records plotted on the basis of their county or parish sources. The number of records for any given county is indicated by the figure placed at or near the center of that county.

The State of Arkansas leads with 359 records, distributed among thirty counties. They are largely concentrated in the western half of the state, and especially in the southwest quarter. Yell County with 108 shows the largest number of records, and Hempstead with 85 is next. Had it been possible to have obtained a larger number of the records of discovered boat-stones from the state, the map would doubtless have shown a somewhat different distributional picture for these artifacts. Reliable information indicates that many of these pieces, especially from Yell County, have been sold outside the state, and have become widely scattered and therefore unavailable for scientific purposes. Yell County must have been the chief center of boat-stone production in this southwest region. Hempstead County has also yielded a large number, but this in part is explained by the active collecting of Mr. Harry J. Lemley who resides in this county.

The fifty-two records from Louisiana are distributed mainly in the northern half of the state, with about two-thirds (30) falling within the northwest quarter. A majority of the other third were reported from the eastern side of the state, near the course of the Mississippi River.

There were 86 records obtained for Texas. Their distribution area extends from the northeastern part of the state, in a southwesterly direction, well into central Texas. The interesting fact is that two-thirds (57) of these records fall within the area of central Texas proper. Of the remaining twenty-nine records, twenty-seven


OKLAHOMA
TEXAS
ARKANSAS
LOUISIANA
HARPER
WOODS
ALFALFA
GRANT
KAY
OSAGE
NOWATA
CRAIG
OTTAWA
WASHINGTON
NEWTON
DOUGLAS
BARRY
STONE
TANEY
CARTER
LOVE
MARSHALL
BRYAN
CHOCTAW
MCCURTAIN
LE FLORE
SEQUOYAH
CHEROKEE
ADAIR
MUSKOGEE
MCINTOSH
PITTSBURG
HASKELL
LATIMER
PUSHMATAHA
PONTOTOC
JOHNSTON
COAL
ATOKA
PUSHMATAHA
MURRAY
GARVIN
STEPHENS
GRADY
CADDO
COMANCHE
JEFFERSON
TILLMAN
COTTON
WICHITA
WILBARGER
HARDEMAN
KIOWA
GREER
JACKSON
HARMON
BECKHAM
WASHITA
CUSTER
ROGER MILLS
DEWEY
BLAINE
KINGFISHER
LOGAN
PAYNE
CREEK
OKFUSKEE
OKMULGEE
TULSA
WAGONER
MAYES
ROGERS
DELAWARE
CRAWFORD
FRANKLIN
SEBASTIAN
LOGAN
YELL
SCOTT
POLK
MONTGOMERY
GARLAND
PIKE
HOWARD
SEVIER
LITTLE RIVER
MILLER
LAFAYETTE
CLARK
HOT SPRING
GRANT
JEFFERSON
SALINE
PULASKI
LONOKE
PRAIRIE
WHITE
JOHNSON
POPE
VAN BUREN
CONWAY
PERRY
FAULKNER
SEARCY
STONE
INDEPENDENCE
CRAIGHEAD
LAWRENCE
SHARP
RANDOLPH
CLAY
GREENE
MISSISSIPPI
CROSS
WOODRUFF
PRAIRIE
ST. FRANCIS
LEE
PHILLIPS
MONROE
ARKANSAS
CLEVELAND
DALLAS
CALLAHAN
EASTLAND
ERATH
HOOD
JOHNSON
ELLIS
NAVARRO
HILL
COMANCHE
BOSQUE
HAMILTON
CORYELL
MCLENNAN
LIMESTONE
FALLS
ROBERTSON
LEON
FREESTONE
ANDERSON
HENDERSON
VAN ZANDT
KAUFMAN
HUNT
RAINS
WOOD
UPSHUR
SMITH
GREGG
RUSK
PANOLA
SHELBY
HARRISON
MARION
CASS
TITUS
FRANKLIN
DELTA
HOPKINS
RED RIVER
LAMAR
GRAYSON
COLLIN
DENTON
COOKE
MONTAGUE
CLAY
WISE
JACK
YOUNG
THROCKMORTON
BAYLOR
ARCHER
KNOX
FOARD
HARDEMAN
WILBARGER
WICHITA
CLAIBORNE
UNION
MOREHOUSE
OUACHITA
CALDWELL
WEST CARROLL
EAST CARROLL
MADISON
TENSAS
CONCORDIA
CATAHOULA
LA SALLE
GRANT
RAPIDES
VERNON
SABINE
NATCHITOCHES
DE SOTO
RED RIVER
BIENVILLE
BOSSIER
WEBSTER
CLAIBORNE
LINCOLN

were reported from the northeastern part of Texas, one from Aransas County on the coast, and one from Taylor County on the eastern edge of west Texas.

The one from the coast is from the farthest point south of any reported boat-stone, at least so far as the writer knows. The specimen from Taylor County, which was reported by Dr. Cyrus N. Ray of Abilene, Texas, represents the farthest point west from which any boat-stone has been reported in Texas. This point is near the 100th meridian, west of which they do not seem to occur. This conclusion is in line with conditions farther west in New Mexico and Arizona, from which, apparently, true boat-stones have never been reported. Dr. Neil M. Judd, Curator of the Division of Archaeology, United States National Museum, has recently stated in a letter (September 21, 1936) to the writer that so far as he knows, boat-stones have not been found in Arizona or New Mexico.

For the State of Oklahoma, only thirty-one records have been obtained. The small number secured is in part due to their scarcity in that state. Several correspondents reported that they had never been able to find boat-stones in Oklahoma. Dr. Forrest E. Clements of the University of Oklahoma, Norman, states that none of his own excavations had ever revealed a single boat-stone (letter, November 5, 1936), and Mr. J. B. Throburn, of Oklahoma City, who has collected extensively in the state, reports that they are rarely if ever found in Oklahoma (letter, November 17, 1936).

The reported pieces came almost entirely from the eastern border of the state, particularly from Muskogee and Le Flore counties. Two records from Oklahoma are not shown on the map. These came from Cimarron County, which is located at the extreme west end of the Oklahoma Panhandle, and were reported by Mr. Compton B. Tate of Kenton, Oklahoma. He expresses the view that they had been brought there, apparently, by some of the local Plains Indians (i.e., they represent trade specimens).

Five records of boat-stones from the extreme western border of Mississippi are plotted on the map, although that state is not to be considered as a part of this study. These few records are included in order to bring out the fact that boat-stones are distributed along both banks of the Mississippi River throughout its lower reaches. One of the records is represented by a specimen in the

Lemley collection, from Bolivar County, and the other four were taken from the published data of Calvin S. Brown (1926).

Before commenting upon the distribution map as a whole, it may be well to mention some of the factors which have probably influenced the character of this map. The number of aboriginal habitations was a very important factor in the determination of the number of artifacts left behind in any given area, and these in turn were dependent upon soil conditions, water supply, climate, available food, and various other environmental factors. The intensity with which a given region has been searched for artifacts is another important factor. Finally, the thoroughness with which the area has been canvassed for records must be taken into consideration.

If all of these factors are kept in mind, it is possible to understand at least some of the "gaps" which are conspicuous on the map. For example, the central Texas area is fairly well represented by records of boat-stones. This region was extremely favorable for Indian habitations, with its many large springs, fine flint for implements, and large herds of game animals for food. Moreover, this region has been intensely searched for Indian relics by the many active collectors residing in the several large cities located within its limits. Another point is that the location of Austin within this area made it possible for the writer personally to canvass this region for records, rather than to depend upon other means for their discovery. Finally, the intensive field work carried on by the Department of Anthropology, The University of Texas, is another large factor.

In contrast to this condition in central Texas, the northeastern section of the state is not so favorably located. It is almost certainly true that large areas of that section have been much less thoroughly searched for artifacts and their records than has been the case for central Texas. It is not surprising then to find several counties, lying between central Texas and the northeastern border, unrepresented by records of boat-stones. From the large number of specimens reported from southwestern Arkansas and the northwest quarter of Louisiana, one would expect to find a larger number of records from northeast Texas. It is probably true that the relatively few records from the southeastern corner of Oklahoma is not due alone to the scarcity of boat-stones there, but rather to the fact that this region has not been thoroughly worked.

With these points in mind, one may view the plotted region on the map as constituting a fairly definite area, which is especially well defined on its southwestern and western borders. If numbers are significant, then southwest Arkansas must represent the center from which the boat-stone culture spread out in the various directions, especially toward the southwest. This suggestion is supported by the shape of that portion of the distributional area which lies in Texas, and is further strengthened by the absence of all boat-stones (except for a few trade specimens) in south and west Texas. The boat-stone culture clearly entered Texas from the northeast.

The eastern edge of this distributional area connects with the Mississippi Valley area, which is one of the main distributional regions of the boat-stones belonging to the eastern division. It is possible that a study of the distribution of boat-stones northward along the Mississippi Valley would throw some light on the origin of the obvious center of this culture in the Gulf Southwest.

d. Suggested Uses of Boat-stones

The exact purpose for which the Indians made boat-stones is entirely unknown. If it be true, as some one has suggested, that every human artifact was first designed in response to some utilitarian need, then boat-stones at one time must have had some definite purpose of a practical nature. In the circumstances, it was natural that many theories would be advanced to explain their use. For the lack of knowledge always stimulates speculation. There are several avenues of approach to a study of this problem, but first it would be well to review some of the suggestions which have been made by the different writers on the subject.

Charles Rau (1879) stated that boat-stones were allied to the problematical pierced tablets, and like them showed no evidence of use. Charles C. Abbott (1881) in his "Primitive Industry" classified the boat-stones as varieties of gorgets, and believed that they were used for the same purpose. Thomas Wilson (1888) also compared them to the flat tablets, and stated that neither one ever showed any evidence of use.

There have been many other suggested uses, such as paint cups, medicine stones, ornamental objects, and Wilson (1896) lists for

the plainer kind such purposes as twine-twisters, handles for carrying parcels, or for tightening cords or lines. Above all, however, the most frequently suggested purpose of boat-stones is that they were some sort of charm stones.

One might expect that there would be some historical document which contains statements made by the Indians to the early settlers concerning the use of these artifacts. The only one that we have been able to find in the literature on boast-stones is Wilson's story, which runs as follows: "A Mohawk medicine woman declared them to be amulets or charms to enable the witches to ferry themselves over streams of water, as the broomstick serves modern witches for flight through the air. If the object should be lost, it was believed that her power of flight or passage was gone. Contrary to every possible usage of the objects as boats, even as toys, they are all drilled and usually with two perforations" (1896, p. 451).

Moorehead, in his "Stone Ornaments of the American Indians" (1917, p. 76), gives a somewhat different version of Wilson's ideas. It is as follows: "The late Dr. Thomas Wilson frequently stated that he believed that they were medicine stones and were potent in warding off evil, that is, if one feared a witch or the power of the shaman, he must make a boat-stone and in it tie a small wooden effigy representing the witch of the shaman. Wilson claimed that years ago some very old Indian told him that canoe-shaped stones were used for that purpose by the old-time Indians. After the effigy of the witch or shaman had been tied in the stone, it was often thrown into a stream or lake, and thus the power for evil was destroyed forever. Whether this is merely a folk-tale or is the true explanation of the use of these stones, I am unable to state."

Harrington (1920, p. 216) has stated a view somewhat similar to Wilson's idea. He reports that the Iroquois and some other tribes visted by him had, until recently, "made little boats out of wood instead of stone, to keep as charms against accidents by water." It is these ideas which have given rise to the widespread belief that boat-stones were used as charms after the manner stated above.

It is desirable to look for evidence in other directions. It is possible that the discovery of one of these artifacts might be made under circumstances which would give some clue as to its probable use. There is some recorded evidence of this nature. A few cup-like pieces, as well as some boat-shaped objects, have been reported to have contained within the hollow or cavity certain materials or objects at the time of discovery. Mills (1916, p. 379) illustrates a stone cup from the Tremper mound in Ohio which was at the time of discovery more than half full of red paint. The cup from Pike County, Arkansas, with the small diamonds and particles of rock crystals, is another example. Reference has also been made to three copper objects, two of which were boat-shaped, and found in the Tremper mound, that contained small quartzite pebbles. There may be other references in the literature, but these citations are sufficient to show that boat-shaped objects were sometimes used as containers.

All of the boat-shaped objects which were examined by the writer were scrutinized for evidence of their possible use as paint containers. The evidence for such use might be indicated by the presence in the cavity of some substance which was commonly employed as paint by the Indians. One specimen (300) was found with the cavity and excavated side stained with iron oxide. Whether the presence of this stain was accidental, or represented Indian paint, one can not be certain. Some of the cup-like forms and a few of the boat-shaped pieces may have been used as containers for various objects or materials, but such use was probably incidental, and not the main purpose of the boat-shaped artifacts.

The possible use of boat-stones as gorgets has been referred to above. In addition to their resemblance to certain forms of pierced tablets, boat-stones have been found in graves under conditions which might support this suggestion. Their interment with the dead seems to have been very infrequent. Moorehead (1917) reports that boat-stones are rarely found in graves. Perkins (1879) and Abbott (1881) both refer to boat-stones found in the Ancient Graves at Swanton, Vermont, but neither of these writers gives the exact relation of the artifacts to the skeletons. Fowke (1896) also refers to a boat-stone which came from a grave in

Sullivan County, Tennessee, but he likewise fails to give details concerning the discovery.

This same infrequency with which boat-stones were buried with the dead is noted in our records from Texas. Although hundreds of skeletons have been excavated in Texas, yet our records show that only four boat-stones were reported as having been found in graves. These are specimens 226, 311, 316, and 317. According to the reports made by the discoverers, three of these pieces were lying on the chest of the skeleton when first exposed by the excavation. The interesting fact is that all four of these specimens are of the perforated type. This may be regarded by some as presumptive evidence that they had been worn after the manner of a gorget, suspended, perhaps, by a string encircling the neck. But it cannot be taken as conclusive proof, because objects other than perforated boat-stones have also been found lying on the chests of excavated skeletons. Furthermore, not all boat-stones were perforated and could not have been suspended as were the gorgets. Of the 359 specimens listed in the tables (see Table 17), only thirty-one had been drilled, and this is less than nine per cent. One hundred three, or twenty-nine per cent, of these pieces are unexcavated, and this fact militates against Wilson's idea, as reported by Moorehead. We must therefore examine certain other structural features of these artifacts.

Two features that are seen on certain of the boat-shaped artifacts immediately attract the attention, and these are the end notches and the keel groove. What was their purpose? The table shows that forty-three of the 359 pieces had notched ends, and that in addition, thirty-four others had the keel groove, which sometimes terminates at the ends in distinct notches. It has been supposed that these two structures were intended to hold a cord by means of which the piece could have been bound to some other object.

A study of these peculiarities, and certain other structural features, had convinced the writer that the boat-shaped artifacts, while in use, must have been bound to an object having the form of a stick or shaft. If this was so, the question was, To what objects were they attached? In the meantime, Professor J. E.

Pearce had suggested, and has since strongly advocated, that boat-stones could have been attached to the throwing-stick, as a weight or charm. This suggestion seemed worthy of careful consideration, and finally lead the writer to examine the literature on the throwing-stick. The results of this study are given in the following pages:

From the writings of Mason (1885), Nuttall (1891), Pepper (1902), Krause (1905), Uhle (1908, 1909) and others, we know that the throwing-stick had a rather wide distribution. It has been found among the Australians, certain northeastern Asiatics, the Eskimos of both North America and Greenland, in France during the reindeer epoch, certain parts of South America, Central America, Mexico, United States, and the Greater Antilles. We are especially interested in its distribution in this country. Evidence of its use has been found in the following states (see literature list for references): Florida, Arkansas, west Texas, Arizona, Colorado, Nevada, New Mexico, Utah, and southern California. There should also be mentioned the discovery by Peabody (1904) of a bone specimen of doubtful authenticity in Coahoma County, Mississippi, which may represent the spur of an atlatl.

At one time the throwing-stick must have had a wide distribution in the United States, but on account of its perishable character it probably disappeared rapidly soon after its replacement by the bow and arrow. It has been found, therefore, only in protected places, mainly in the rock shelters and caves of the semi-arid Southwest. During the last fifteen or twenty years traces of the atlatl have been reported by a number of archaeologists working in this region. They have found not only such parts as the atlatl darts, both mainshafts and foreshafts, and broken fragments, but also the complete or nearly complete weapon, sometimes with all of its trappings intact. According to the reports of Roberts (1929, 1931), the classic period Basket Makers, I and II, shows only the spear and spear thrower, while the bow and arrow apparently did not make its appearance until late in Masket Maker III times. The latter weapon finally replaced the atlatl, which he states "did not survive for any length of time, if at all, in the Pueblo era" (Roberts, 1931, p. 159).

Our chief interest in the throwing-stick pertains to the practice of the aborigines of attaching to this weapon stone objects which

might have served either as weights or as charms. According to Krause (1905), certain of the Australians covered the grip of their throwing-stick with rosin into which a shell or stone was stuck, but this was done merely to increase the effectiveness of the grip. Uhle (1908, 1909) has shown that the aborigines of Ecuador and Peru attached to their throwing-stick, toward the proximal end, an object composed either of stone, tooth, or bone. This hook, as he called it, was often ornamented with carved faces, but it was likewise a strictly utilitarian object, since it served as a hand grip.

Neither of these cases applies to the question under discussion, and we must turn to the throwing-sticks from southwestern United States for pertinent evidence. Otis T. Mason (1893) was the first to describe these interesting weapons and to point out their similarity to the Mexican atlatl. He discovered two examples of the atlatl in an exhibit from Colorado at the World's Columbian Exposition at Chicago. His description of these weapons (as quoted by Pepper, 1902) is exceedingly clear and complete. Concerning one of these specimens, he says, "Just below the finger-loops, or stirrups, were a long chalcedony knife or arrow-blade, the tooth of a lion and a concretion of hematite seized by a plentiful wrapping of yucca cord."

Later Cushing (1895) stated that the wrapping was of cotton yarn, and that the tooth was a wild cat's tooth. He assigns the source of the piece to Mancos Cañon in southwestern Colorado, but apparently it had been found by McLoyd and Graham in southeastern Utah, in the grand Gulch (Pepper, 1920, p. 114). Cushing (1895, p. 341) saw in this unusual attached bundle further proof for his belief in fetishes.

Pepper (1902) describes a number of throwing-sticks from the Southwest, and classes them as either utilitarian or ceremonial objects. Under the latter class he refers to one from San Juan County, Utah, which contained vestiges of feathers and coarse bristles, concealed beneath wrappings of sinew that extended a short distance in front of the finger-loops.

Starr (1898) describes and illustrates a throwing-stick from Utah which had fastened to the back, by wrappings of sinew, a pebble of translucent quartz, 30 by 14 mm. He stated that it was flat on the

contact side, convex on the opposite side, and was elliptical in outline. He suggested that this stone probably represented a luckstone or charm.

Among the more recent finds of importance are those reported by Kidder and Guernsey (1919), Guernsey and Kidder (1921), and Guernsey (1931), in connection with their archaeological studies of northeastern Arizona. These writers describe a series of stone objects, or atlatl stones, which in some cases were found attached to the back of the weapon. In the 1919 paper they report the discovery of one almost perfect atlatl and three or four fragments. The most perfect specimen came from burial Cyst 10, Cave I. It was found lying beneath the buried body. Seven inches from the proximal end of the stick, on its flat side, they found marks of wrappings, and lying just beneath this point was a curious perforated stone object, composed of banded limestone. It was found that the hole held the bindings that once attached the stone to the back of the shaft. In another burial cave they found two other stone objects, which, on the basis of the one from Cave I, they identified as atlatl stones. These pieces are flat on one side and convex on the other, and are more or less loaf-shaped. Both showed distinct traces of lashings on the upper or convex side, thus bearing out their interpretation that these stones had once been attached to atlatls. In commenting on the probable significance of these three stones, they state (p. 180), "they may have served as weights to give a proper balance or to lend added power to the apparatus. The peculiar shape of the Cave I specimen, and the fine finish of all three, make it seems possible, however, that they may have had other than a utilitarian purpose."

In the 1921 paper, Guernsey and Kidder describe a series of eleven "weights" or atlatl stones taken from the burial cysts of the White Dog Cave in northeastern Arizona. Six of these objects were found attached to the backs of two atlatls; three on one complete weapon, and three on a fragment found in a skin container taken from the robe of mummy 2, Cyst 24. In each case they were arranged in a row, starting at or near the finger-loop and extending distally along the back of the shaft. Each piece was held tightly in place by sinew wrappings smeared with pitch.

Of the five unattached pieces, one had been chipped from translucent quartz and resembled a diminutive "turtle back" with one

flat side and with faint marks on the convex surface that appeared to have been made by wrappings. It was found in Cyst 27, from which had been taken an atlatl that showed the print of a former ligature on the front side, and a light colored oval mark on the convex side, corresponding in size and shape to the flat side of the quartz piece, thus indicating that the stone had once been bound to the back of this atlatl. At the bottom of Cyst 27 they found four loaf-shaped stones, which were identified as atlatl stones. One of these has rather pointed ends and has a deep concavity excavated in the under or flat side.

Guernsey (1931) reports still other discoveries of the atlatl stone. One very perfect weapon from the Broken Roof Cave had three "charms" fastened to the back side. One of these, attached just above the finger-loops, is a small black nut or seed, and just distal to this, was a "cat's eye" or moonstone worked to the form of a chunky loaf. The third specimen was located seven and three-quarter inches from the distal end. It is very beautifully made and is well polished. Two other atlatl stones were found in contact with an atlatl which was complete except for the finger-loops. It is clear from these citations that the practice of attaching stones to the back of the atlatl must have been a common, if not universal, one in the Southwest, as Kidder and Guernsey (1919) have pointed out.

In recent years a number of writers have reported the discovery of parts of the atlatl in the caves of west Texas, but so far no one has reported the discovery of the atlatl stone. This is not surprising in view of the nature of the evidence, which in several instances consisted of finding only the atlatl darts, both foreshafts and mainshafts (Alves 1930, Smith 1932, Roberts 1930, Pearce and Jackson 1933). Martin (1933) found a detachable device which he identified as the spur of an atlatl. Gardner and Martin (1932) have described the distal part of an atlatl found in Val Verde County. Setzler (1933) reports the discovery of a fragment of the hand end of an atlatl, which had been broken at about the level of the notches for the finger-loops. Finally, Coffin (1932) reports finding four fragments of the nock (distal) ends of atlatls. None of these writers has described the complete weapon with all of its parts intact, and especially significant is the fact that in all of these cases, that part of the atlatl to which the atlatl stones of Arizona were usually found attached is unrepresented. We must therefore await further

evidence before deciding that the atlatl stone was not used in west Texas.

Other points at which the atlatl has been found in this country are Arkansas and Florida. Harrington (1924) found in the sites of the "Ozark Bluff-dwellers" in northwestern Arkansas one complete and three or four fragments of a type of atlatl which had previously been reported from Mexico, but he does not report the discovery of the atlatl stone. Cushing (1897) found atlatls at Key Marcos, Florida, but under conditions which probably would have caused the loss of any attached stones. This evidence, although fragmentary, indicates that the use of the atlatl must have covered a wide area in this country.

The matter of the atlatl and its attached stones has been given in considerable detail, with the view of laying the basis for a comparison of certain boat-shaped artifacts from the gulf southwest states with the atlatl stones from the caves of northeastern Arizona. Unfortunately, the writer has not had the opportunity to make this comparison with both types of specimens in hand, but from the careful descriptions given by Kidder and Guernsey, together with their illustrations, he is convinced that some of the boat-shaped objects are very similar to the atlatl stones. The only exception to this comparison is found in the specimen described by these authors in 1919 (Plate 83, b). No stone of this peculiar shape has been reported to the writer from the gulf southwest. It is possible that someone else has observed and commented upon this similarity, but if so, the writer has not been able to find a reference to it in the literature.

A comparison of a few of the boat-shaped pieces with the atlatl stones will be made. A view of the convex side of specimen 109 is shown in figure 43, Plate 5. If this illustration is compared with the same view of the atlatl stone presented in Plate 83 c by Kidder and Guernsey (1919), it will be seen that the two pieces are practically identical. Both have flat bases, square ends, high loaf-like tops, are finely finished, and are of about the same size. The only difference is the absence of tracings of the wrappings on the Arkansas specimen, which can be accounted for on the basis of its exposure to the wet soil. There are several other pieces listed in the tables which are similar to 109, and among these may be cited specimens 112, 114, and 116. Guernsey (1931, Pl. 50)

illustrates three views of an attached stone that is very similar to specimen 110 (fig. 44, Plate 5), which is only one of several other similar pieces reported from this area. Several more of their figures show atlatl stones which resemble the boat-shaped pieces of this region.

On the basis of these comparisons, the conclusion seems logical that some of the unexcavated boat-shaped artifacts from the gulf southwest represent atlatl stones. This is particularly true of the unexcavated pieces which have been reported from Arkansas, where Harrington discovered the atlatl.

But these considerations raise other questions of still greater importance. What, if any, is the relation of the unexcavated to the excavated specimens? Do we have here in the gulf southwest a mixture of two or more distinct types of artifacts, designed for entirely different purposes, or, does the so-called hollow boat-stone merely represent a further development of the atlatl stone? These are questions demanding very careful consideration.

In the first place, it should be emphasized that Guernsey and Kidder (1921, p. 78, Plate 17, f, g) described and illustrated a deeply excavated piece which they identified as an atlatl stone. The detailed study of the pieces described in this paper reveals two other facts which have a bearing on these questions. Many of the excavated specimens are strikingly similar in form and size to unexcavated pieces, and only differ from them in having a cavity. So much so is this true, that it was deemed advisable, in many instances, to classify them under a single variety. The second fact is, that among hollowed out specimens, one finds every degree of excavation on the base, from pieces with a mere "scratch" to those with a large cavity and shell-like walls.

These considerations raise still another question: Why did the aborigines hollow out the base of the boat-stone? Professor Pierce has suggested to the writer that the cavity might have been made for the purpose of holding gum with which to fasten the piece more securely to the shaft. This is a possible explanation, especially in view of the fact that the Indians frequently used gum as means for binding two objects together. There is another possible explanation. If the atlatl stone was first employed as a weight balancer, the practice of excavating the base may have had

as its purpose the regulation of the weight of the piece. This would have the advantage of allowing the use of a larger and more attractive object, without at the same time unduly increasing the weight. On the average the excavated pieces are larger than the unexcavated specimens. The average length, width, and depth of the former are 74.6, 32.0, and 25.3 mm., respectively (187 pieces), and the corresponding averages for the latter, are 72.4, 26.8, and 23.6 mm. (109 pieces). The writer has recently come across a statement by Beauchamp (1897, p. 61) in which is expressed a similar view, but in an entirely different connection. After pointing out the similarity between the excavated and unexcavated specimens from New York, he goes on to say, "The excavation, however, may be merely a device to make the stone lighter, rather than an essential feature."

Some types of boat-stones have structural features which would be of aid in fastening them to a shaft, like that of the atlatl. Such features as notches and grooves must have been intended, as several writers have pointed out, as means of tying the piece to some foreign object. A few specimens have been described which have a transverse groove passing from one side to the other over the top, or simply across the top, and located near the middle. This groove would permit the binding of the piece to another object by means of cords passing over this central groove (Brown, 1909). Mr. W. I. Jenkins of Tyler, Texas, has two pieces of this type, one from Tenneseee and the other from Arkansas. There belongs to this type of boat-shaped pieces the two specimens from the auriferous gravels of California, figured by Holmes (1919, p. 66). Instead of having a single transverse groove at the middle, there is one near each end. Specimen 133 (Table 7) shows another variation, in that there are small transverse notches on the edges of the base near the middle. Still another variation is seen in specimen 239 (fig. 107, Plate 16). This boat-stone has a flat base and a very small v-shaped keel groove. At the middle of the keel edge is a well-worn transverse notch, which is clearly visible in the photograph. All specimens with the transverse type of groove could have been securely fastened to the shaft of the atlatl, especially if green sinews or rawhide were used for the lashings.

A comparatively large number of specimens have notched ends, or keel groove, or a combination of both. Many of these are illustrated in the plates. Such structures admit of no other interpretation than that they were intended as means for fastening the piece to some other object. However, to attach such a piece to a shaft by a cord would require the assumption that the object, to which it was attached, must have been drilled with holes to receive the cord passing over the groove or notches. This is not an impossible assumption, for Pepper (1902) has described a throwing-stick from New Mexico which had a small perforation drilled through its distal part.

Certain of the cup-like forms, which are clearly not boat-stones, not boat-shaped stones certainly, have been included in this study because of the fact that some of them have cut across the convex side well marked grooves (figs. 6, 11), which must have served a purpose similar to that of the keel groove in oblong specimens.

There is one type which presents certain difficulties if one attempts to determine just how the piece might have been attached to a shaft. It is not altogether clear how some of the high thin specimens, listed under Variety XXXI, could have been effectively anchored to an atlatl. Many of these pieces, however, have a beautifully made groove and a base of sufficient width at the middle (fig. 127) to give a good contact with the shaft.

There remains to be considered the typical perforated boat-stones. It was pointed out several times in the descriptions that perforated boat-stones usually have a peculiarly constructed base, which was referred to as "dished." Some of the unperforated pieces, both excavated and unexcavated, also have this same type of base, but it is especially common among the perforated pieces. Among the nineteen pieces listed under varieties XXXIII to XXXVII, all except one show the dished base in some form or another. The one exception is specimen 320 (figs. 148, 149). In these forms the base is not flat, but instead is concave from one end to the other. This condition is well brought out in figures 139 and 141, and especially so, in the extreme type shown in figures 151–153. The form of the base is well adapted to fit against a cylindrical surface, and could scarcely have been designed for any other purpose. The back of the atlatl, certainly in many instances, presented just such a surface. The performations in such pieces make it easy to tie the object to

a shaft. A two-strand cord inserted from the outside through one of the holes may be passed along the bottom of the cavity and out through the other hole. The strands may then be separated at each end and tied about the shaft to bind the piece firmly to it. While the presence of such features as perforations, notches, or grooves would facilitate the attaching of the piece to a shaft, yet specimens not having such features could also have been bound to a shaft by means of wrappings, as was done in the case of the atlatl stones of Arizona.

In the above section the writer has endeavored to present the more important suggestions that have been offered to explain the purpose of boat-stones. Considerable space has been given to the suggestion that boat-shaped pieces could have been bound to the throwing-stick, either as a weight balancer or as a charm, or as both. A number of facts concerning the structure of these objects have been cited as evidence favoring this theory as to their use. Its validity, however, will finally depend upon the establishment of certain other facts. One of these is the question of the former range of the atlatl in this country. The theory would require that this weapon had at one time been used over the area where boat-stones have been found. This is a difficult matter to determine, because much of this area lies within a region in which the perishable atlatl is least likely to have been preserved.

The postulated disappearance of the atlatl from the greater part of the distributional area of the boat-stone does not exclude the possibility of finding other evidence of its use in that area. Harrington has pointed out that projectile points suitable for the atlatl, but too large for service as arrowheads, have been found as far east as the Atlantic coast. Pearce (1932) has shown that the kitchen middens of central Texas are composed of three culture levels, upper, middle, and bottom, and that the upper level alone contains the true arrowpoints. The projectile points found in the middle and bottom levels are too large to have been used as arrowpoints, but they could have been thrown with the hand spear, or with the atlatl. This is precisely the kind of chronological evidence that one would expect to find in these middens, if the atlatl had been replaced by the bow and arrow as a weapon.

This theory naturally raises the question as to the exact purpose of tying a stone to the atlatl. There is no way of showing whether

this practice had as its object a purely utilitarian purpose, or also carried with it the idea of luck or charm. From the character of these stones, as well as from the nature of some of the other objects which have been found attached to the shaft, one would surmise that the element of charm was a part of the motive.

To suppose that the atlatl stones gave rise to the boat-stones, and these in turn became developed into talismanic objects, would be in line with what is supposed to have happened in the development of certain other classes of artifacts. To cite a parallel case, one has only to recall the class of stone axes with its large ceremonial specimens. Some of the boat-shaped pieces are entirely too large and heavy to have been bound to an atlatl, and they could have been used for ceremonial purposes. Possibly some of the smaller, finely made pieces were employed for a similar purpose. Moreover, it is reasonable to assume that after the atlatl fell into disuse, the Indians continued to make, in some places and some measure, the boat-stones as charms or fetishes, and hence, in time their original purpose would have become completely lost in antiquity. In the judgment of the writer, however, the general import of these stones in the American Indian life is that they were used primarily as weight stones bound to atlatls to give the weapon additional weight and efficiency, and that in some instances, at least, the motive of charm may be assumed.

POSTSCRIPT

While this paper was in press, an article by W. E. Baker and A. V. Kidder (Amer. Antiquity, Vol. 3, pp. 51–52, July, 1937) appeared which has a distinct bearing on certain points discussed above. They report the discovery of a fragment of a spear-thrower and a slotted foreshaft which were found in a cave on the Cimarron River in the northwestern part of Cimarron County, Oklahoma. They conclude that the artifacts in this cave indicate a culture analogous to that of the San Juan Basket Maker II. They express the view that "the bow came into use in the New World in relatively recent times, and that prior to its introduction, or its much less probable local invention, the spear-thrower enjoyed continent-wide distribution in both Americas."

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DESCRIPTION OF PLATES

In the descriptions of the figures shown on the frontispiece and plates the specimens are referred to by the numbers under which they are listed in the tables.

PLATE 1

The figures on this plate are reproduced at 4/5 natural size.

Fig. 1. View of specimen 6, showing oval-shaped cavity.

Fig. 2. Specimen 33, view of cavity.

Fig. 3. Specimen 25, showing a reworked sandstone concretional shell.

Fig. 4. Specimen 27, which, when discovered, contained two small diamonds and two small particles of rock crystal.

Fig. 5. View of the cavity of specimen 22.

Fig. 6. View of the lower side of specimen 16, showing groove.

Fig. 7. Side-top view of specimen 20.

Fig. 8. Side-top view of specimen 12.

Fig. 9. Specimen 21, which resembles certain types of boat-stones.

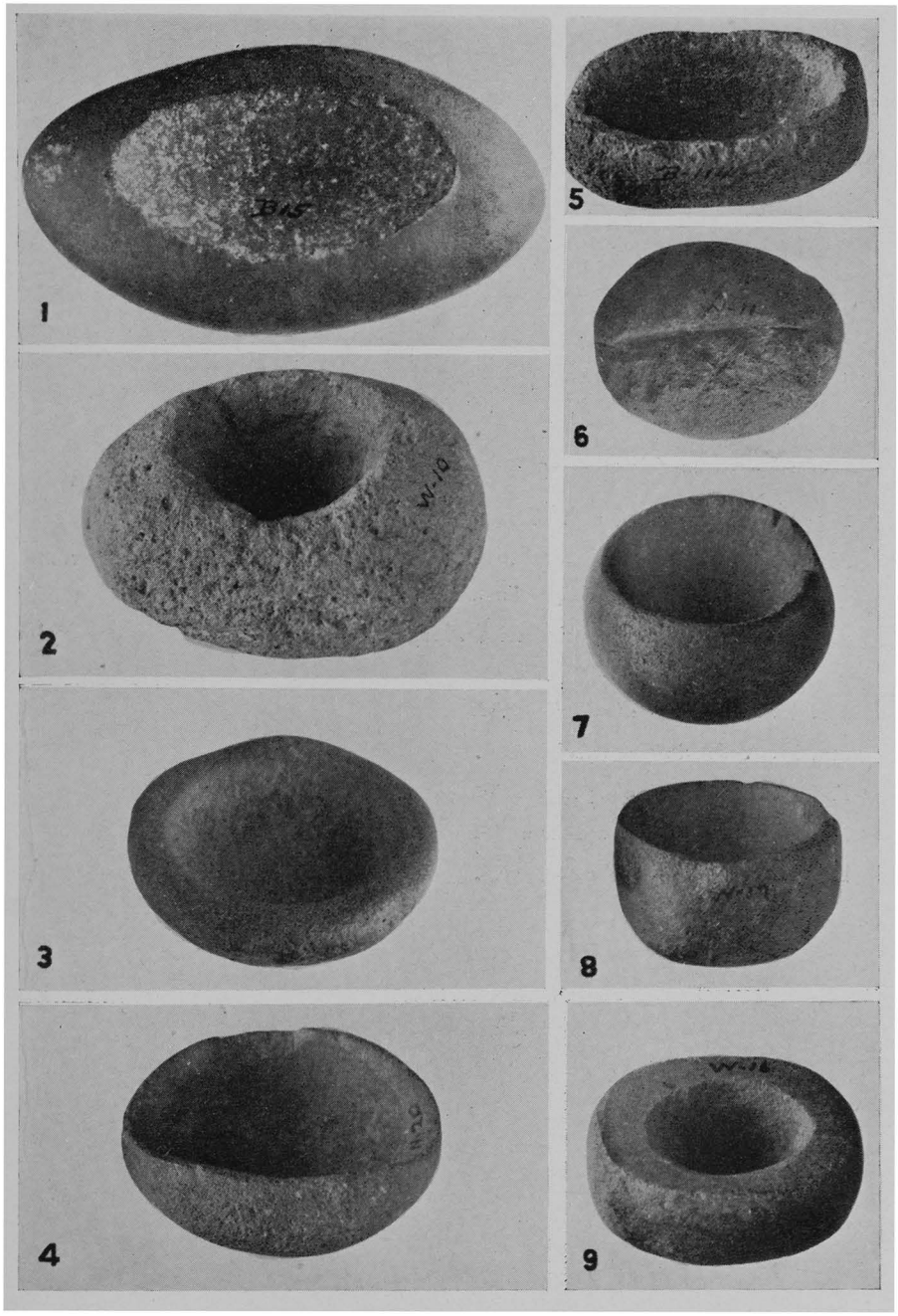
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PLATE 2

The figures on this plate are reproduced at 8/9 natural size.

Fig. 10. Specimen 29, made from a sandstone concretion.

Fig. 11. Specimen 24, view of convex surface or "bottom" showing the cross grooves and incised decorations.

Fig. 12. Side view of specimen 19, which is a finely made cup, from a sandstone concretion.

Fig. 13. Base view of specimen 37.

Fig. 14. Side view of specimen 38.

Fig. 15. Base view of specimen 38.

Fig. 16. Side view of specimen 45.

Fig. 17. Side view of specimen 44.

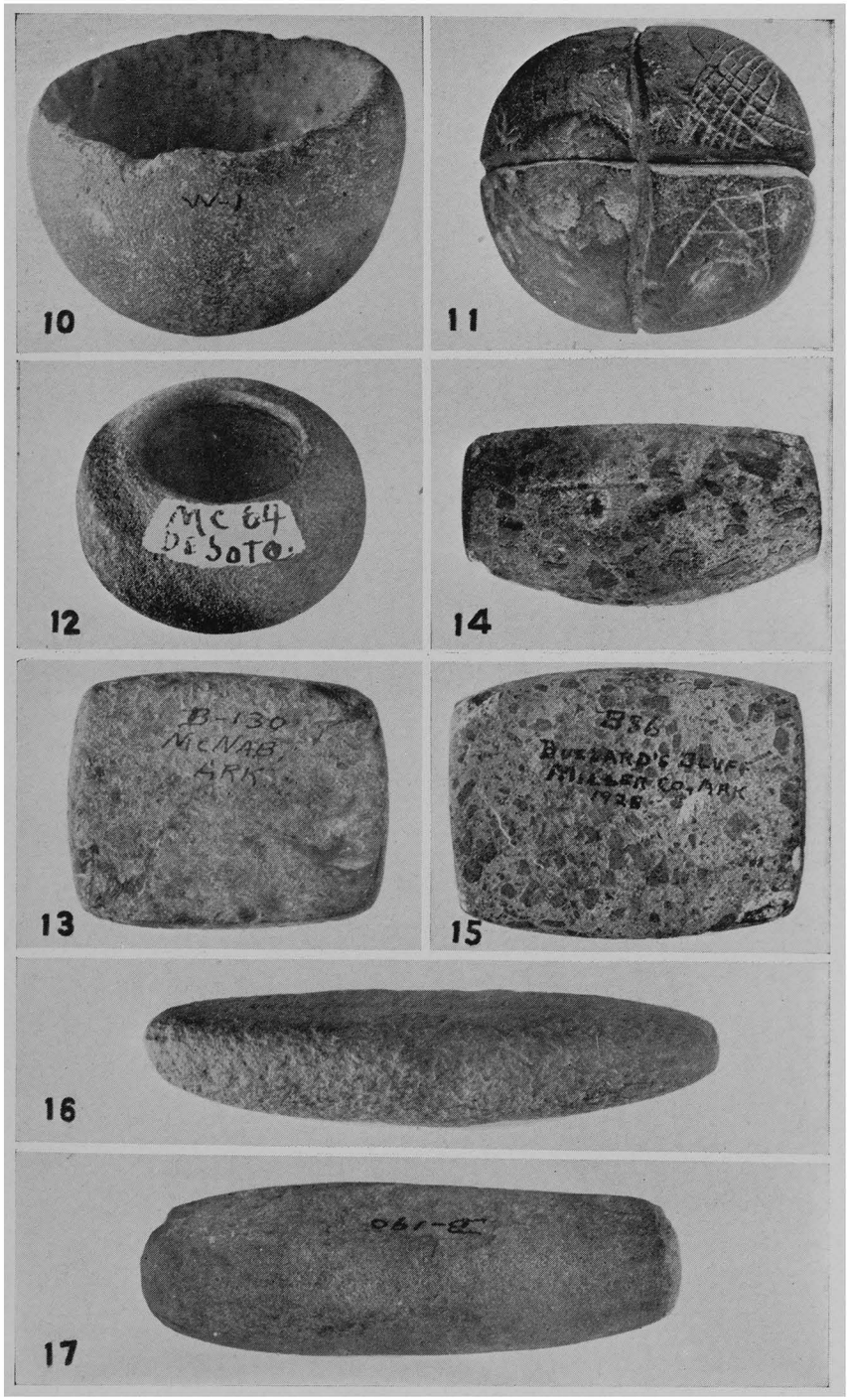
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PLATE 3

The figures on this plate are reproduced at 2/3 natural size.

Fig. 18. View of convex surface of specimen 52, showing notches at ends.

Fig. 19. Side-base view of specimen 53.

Fig. 20. Base view of specimen 48. Note shallow excavation.

Fig. 21. Base view of specimen 67.

Fig. 22. Base view of specimen 64.

Fig. 23. View of convex surface of specimen 61, decorated with heavy criss-cross incised lines.

Fig. 24. Base view of specimen 60.

Fig. 25. Side view of specimen 65.

Fig. 26. Specimen 79. The hole at the bottom of the cavity is not a drilled performation, but is the result of a break caused by use.

Fig. 27. View of the cavity of specimen 74, showing a single perforation drilled from the inside.

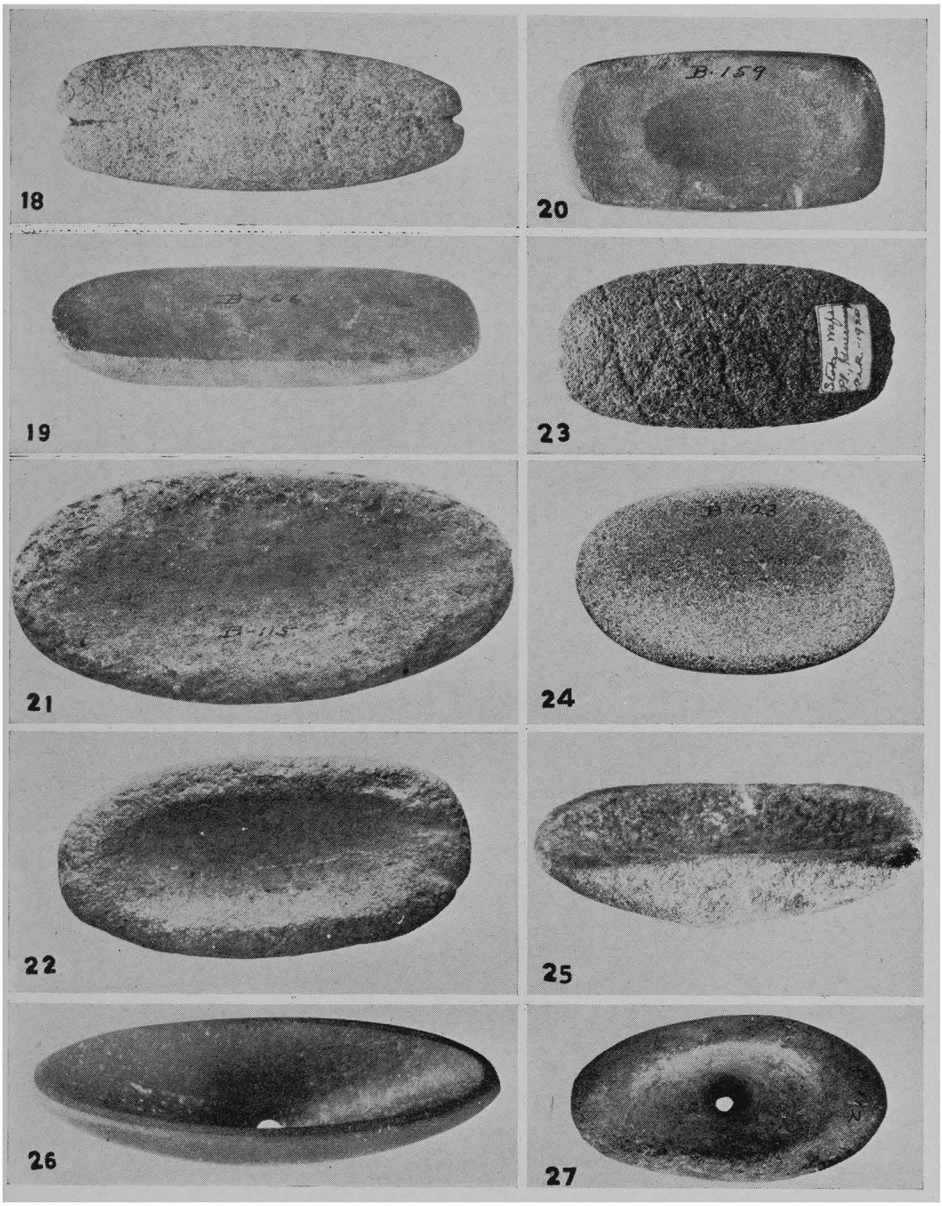
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PLATE 4

The figures on this plate are reproduced at 4/5 natural size.

Fig. 28. View showing deep cavity of specimen 76.

Fig. 29. View of convex surface or "top" of specimen 89, showing criss-cross grooves and two pits.

Fig. 30. View of convex surface of specimen 88. The surface crust of iron has scaled off in several places.

Fig. 31. View of convex surface of specimen 85.

Fig. 32. Base view showing shallow cavity and notched ends of specimen 86.

Fig. 33. Side-base view of specimen 81.

Fig. 34. Side-base view of specimen 82.

Fig. 35. Side-base view of specimen 83.

Fig. 36. Side view of specimen 90.

Fig. 37. Base view showing groove-like cavity and notched ends of specimen 93.

Fig. 38. View showing cavity of specimen 92.

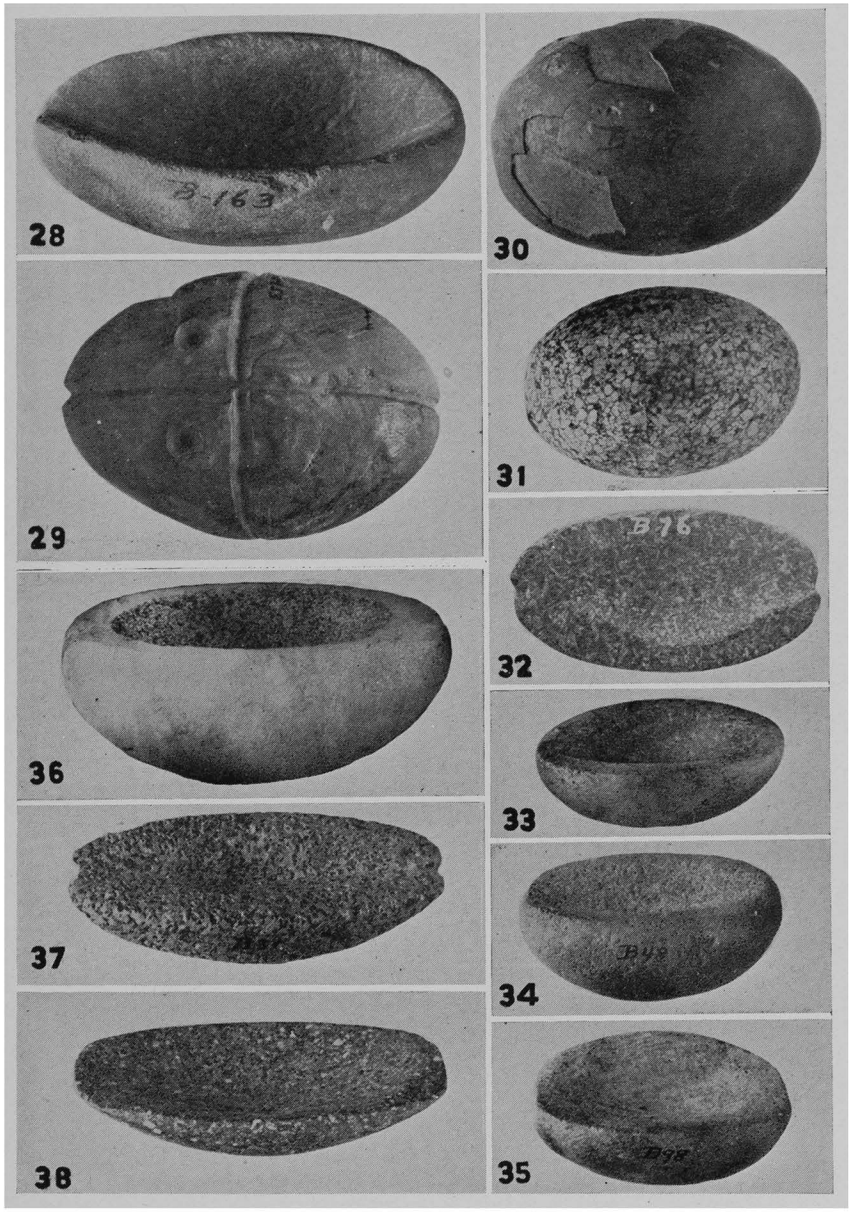
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PLATE 5

The figures on this plate are reproduced at 3/4 natural size.

Fig. 39. Side-base view of specimen 95.

Fig. 40. Side-base view of specimen 97.

Fig. 41. Side-base view of specimen 96; note shallow cavity.

Fig. 42. Side-base view showing unfinished cavity of specimen 102.

Fig. 43. Top view of specimen 109.

Fig. 44. Side-base view of specimen 110.

Fig. 45. Side view showing cavity of specimen 124.

Fig. 46. Side-base view of specimen 128, showing cavity and end notches.

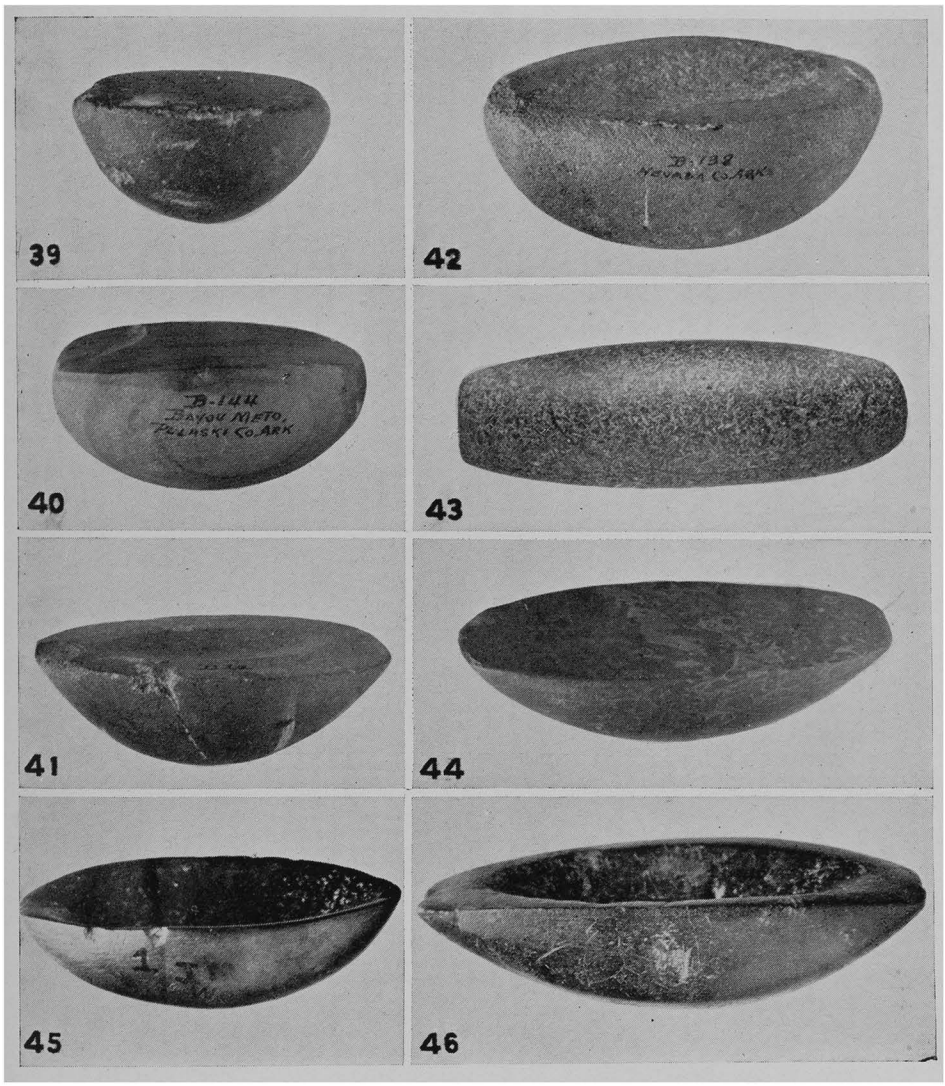
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PLATE 6

The figures on this plate are reproduced at 5/6 natural size.

Fig. 47. View showing large cavity and square ends of specimen 134.

Fig. 48. View showing cavity and square ends of specimen 135.

Fig. 49. Base view of specimen 137.

Fig. 50. Base view showing cavity and notches of specimen 138.

Fig. 51. View showing deep groove on convex side of specimen 139.

Fig. 52. Base view showing large cavity and notches of specimen 140.

Fig. 53. Base view of specimen 141, showing groove-shaped cavity.

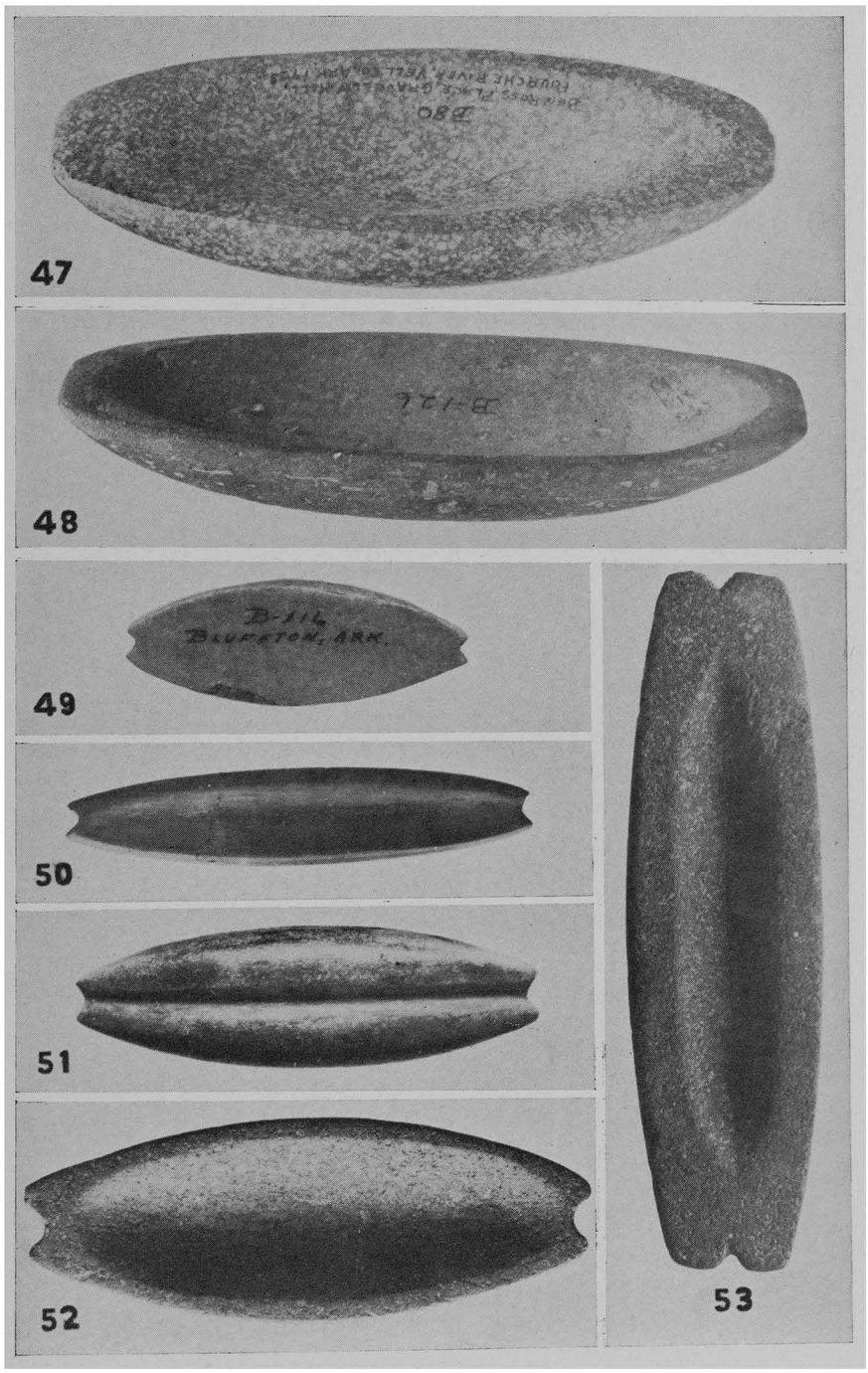
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PLATE 7

The figures on this plate are reproduced at 3/4 natural size.

Fig. 54. Side view of specimen 145.

Fig. 55. Side-base view of specimen 143.

Fig. 56. Side view of specimen 142.

Fig. 57. View showing keel groove of specimen 155.

Fig. 58. Side view of specimen 152.

Fig. 59. View of cavity of specimen 150.

Fig. 60. Side-base view of specimen 149.

Fig. 61. Side view showing scaling off of iron crust of specimen 167.

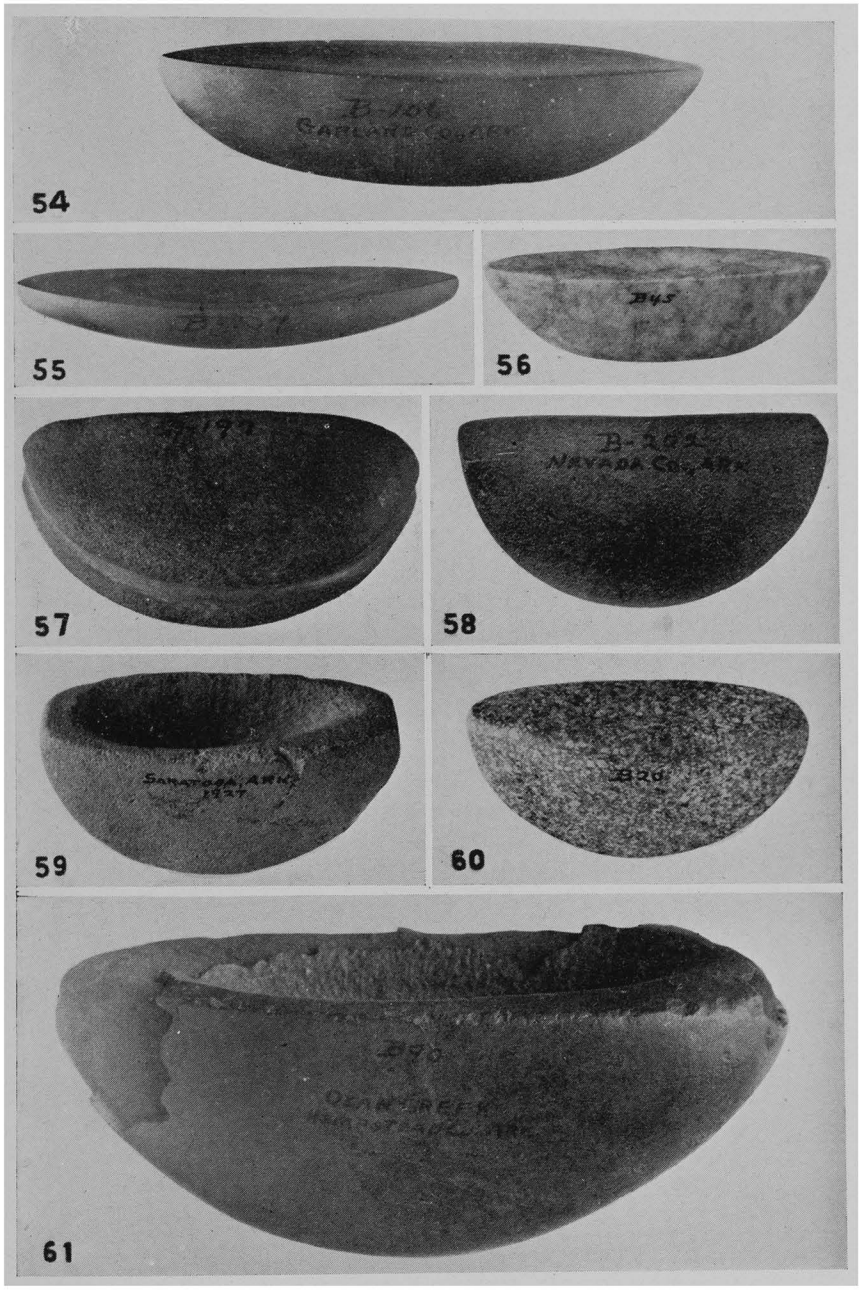
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PLATE 8

The figures on this plate are reproduced at 7/8 natural size.

Fig. 62. Side-base view of specimen 166.

Fig. 63. Side-base view of specimen 164.

Fig. 64. View of keel of specimen 164.

Fig. 65. View showing cavity and side of specimen 171.

Fig. 66. Side-base view of specimen 176.

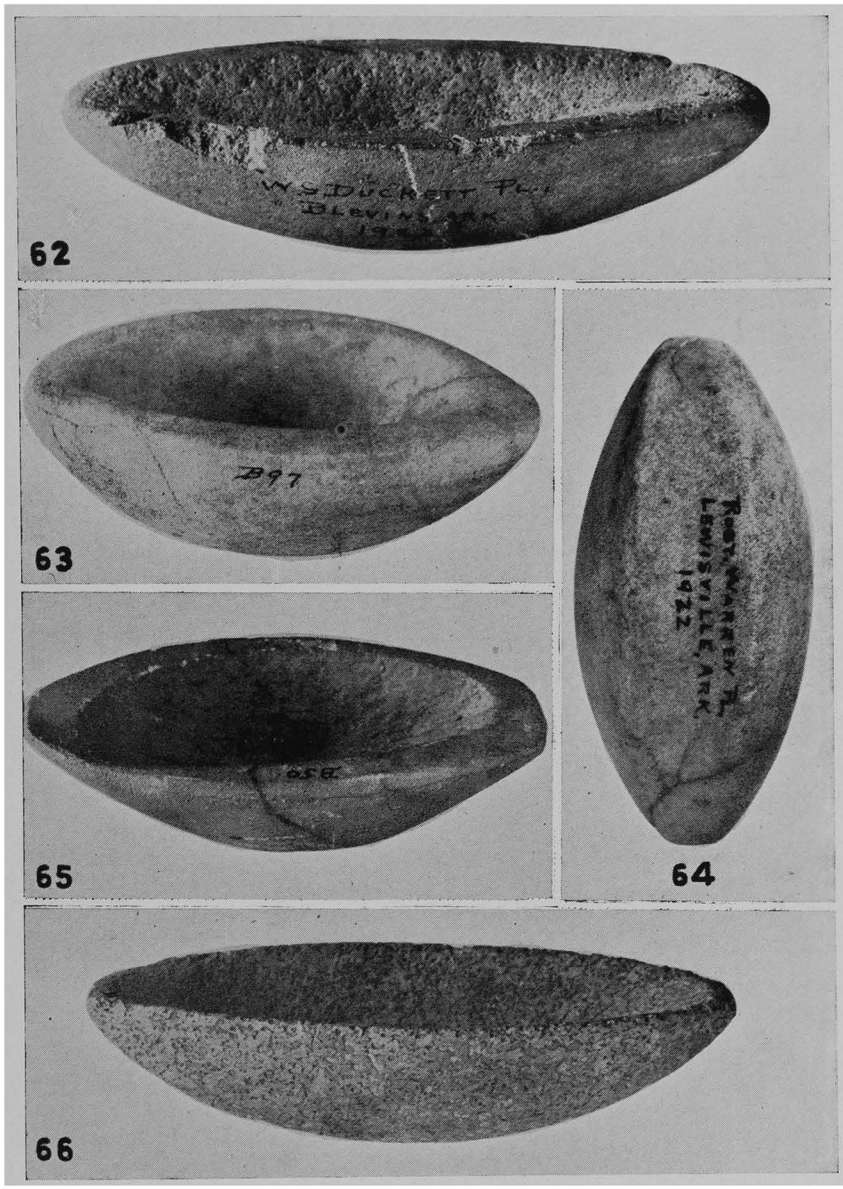
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PLATE 9

The figures on this plate are reproduced at 8/9 natural size.

Fig. 67. View of side and cavity of specimen 174.

Fig. 68. View of broad keel of specimen 175.

Fig. 69. View of side and cavity of specimen 180; note the notches.

Fig. 70. Same view of specimen 179, showing notches.

Fig. 71. Same view of specimen 181. The left end has been injured.

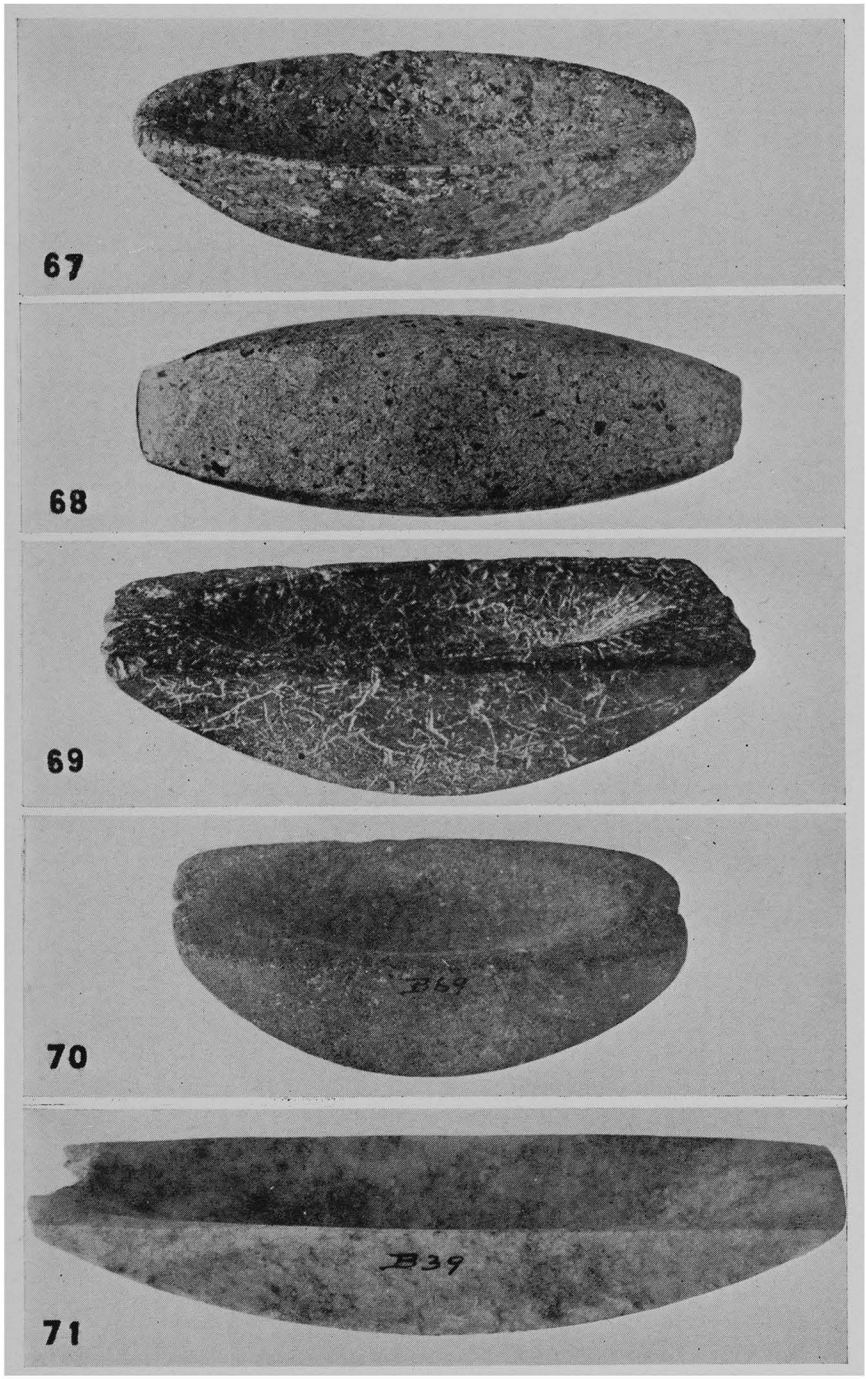
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PLATE 10

The figures on this plate are reproduced at natural size.

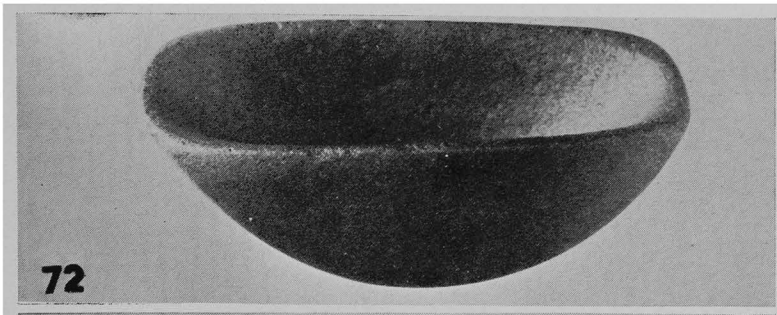
Fig. 72. View of side and large cavity of specimen 184.

Fig. 73. Same view of specimen 187.

Fig. 74. Same view of specimen 185.

Fig. 75. Keel view of specimen 185 showing the perforations.

Fig. 76. View of side and cavity of specimen 188.



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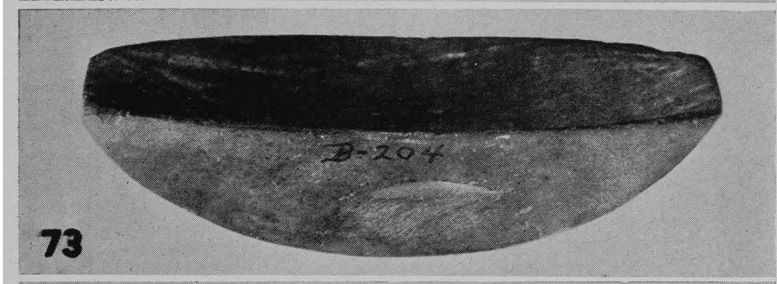

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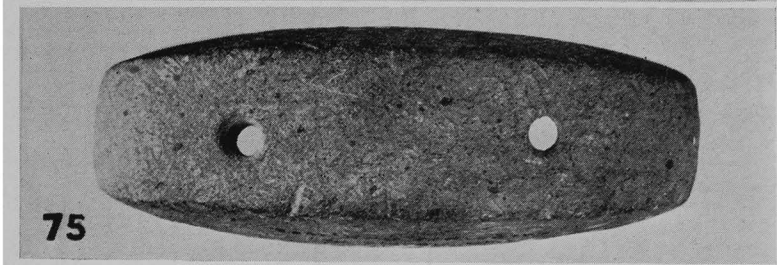

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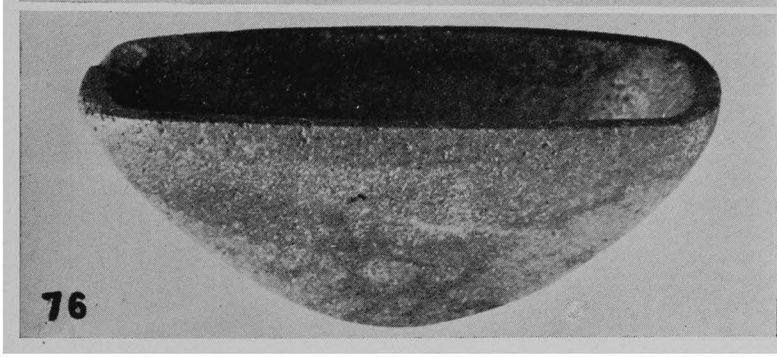

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PLATE 11

The figures on this plate are reproduced at 4/5 natural size.

Fig. 77. View of side and flat base of specimen 192.

Fig. 78. View of broad beveled keel of specimen 191.

Fig. 79. Side-base view of specimen 194.

Fig. 80. View of finely beveled keel of specimen 201.

Fig. 81. View showing keel with groove of specimen 199.

Fig. 82. View of beveled keel with shallow groove of specimen 206.

Fig. 83. View of side and cavity of specimen 209.

Fig. 84. View showing finely beveled keel of specimen 208.

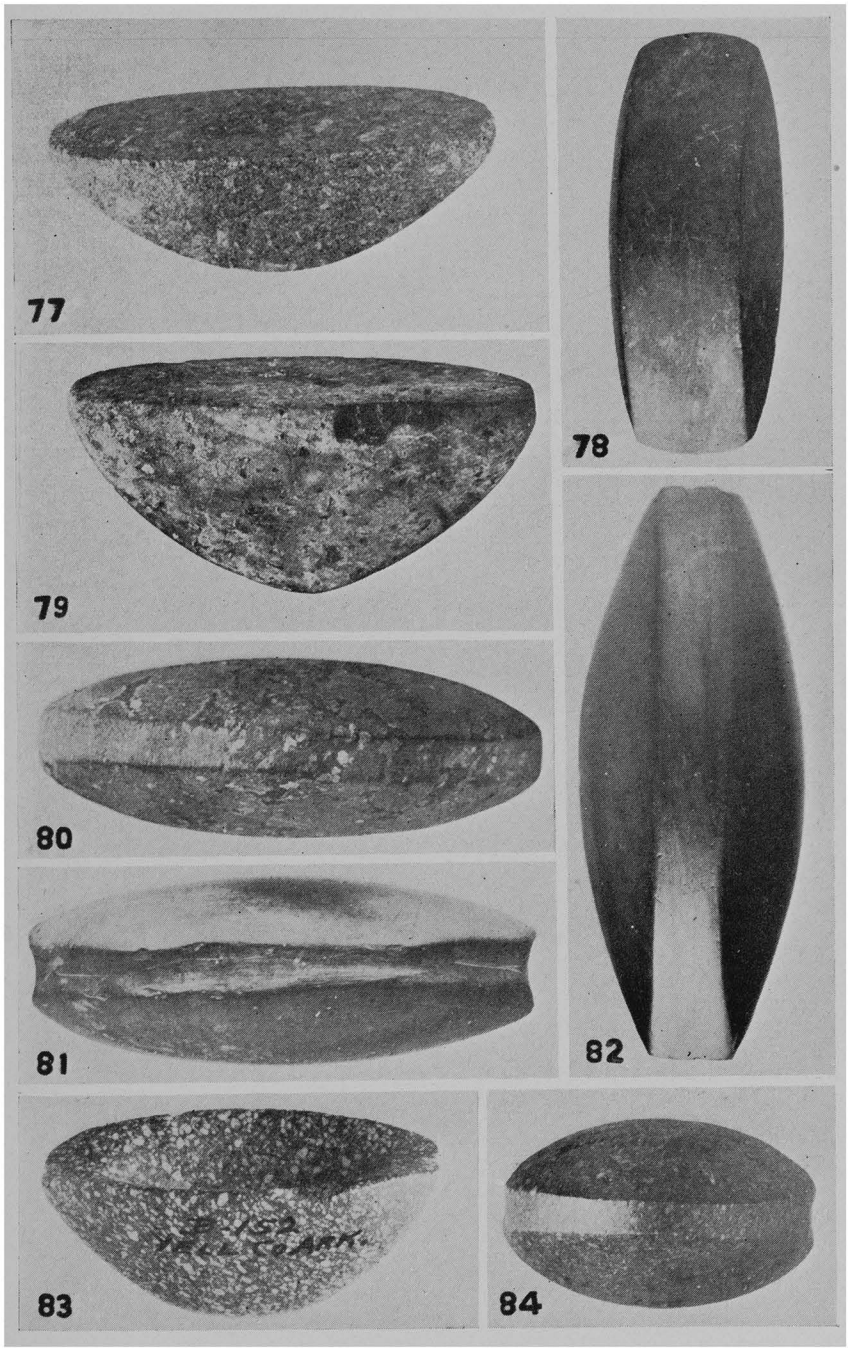
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PLATE 12

The figures on this plate are reproduced at 8/9 natural size.

Fig. 85. Side view of specimen 221.

Fig. 86. Base view of the same piece, showing cavity and notches.

Fig. 87. View of the keel of the same piece.

Fig. 88. View of side and cavity of specimen 222.

Fig. 89. Same view of specimen 218.

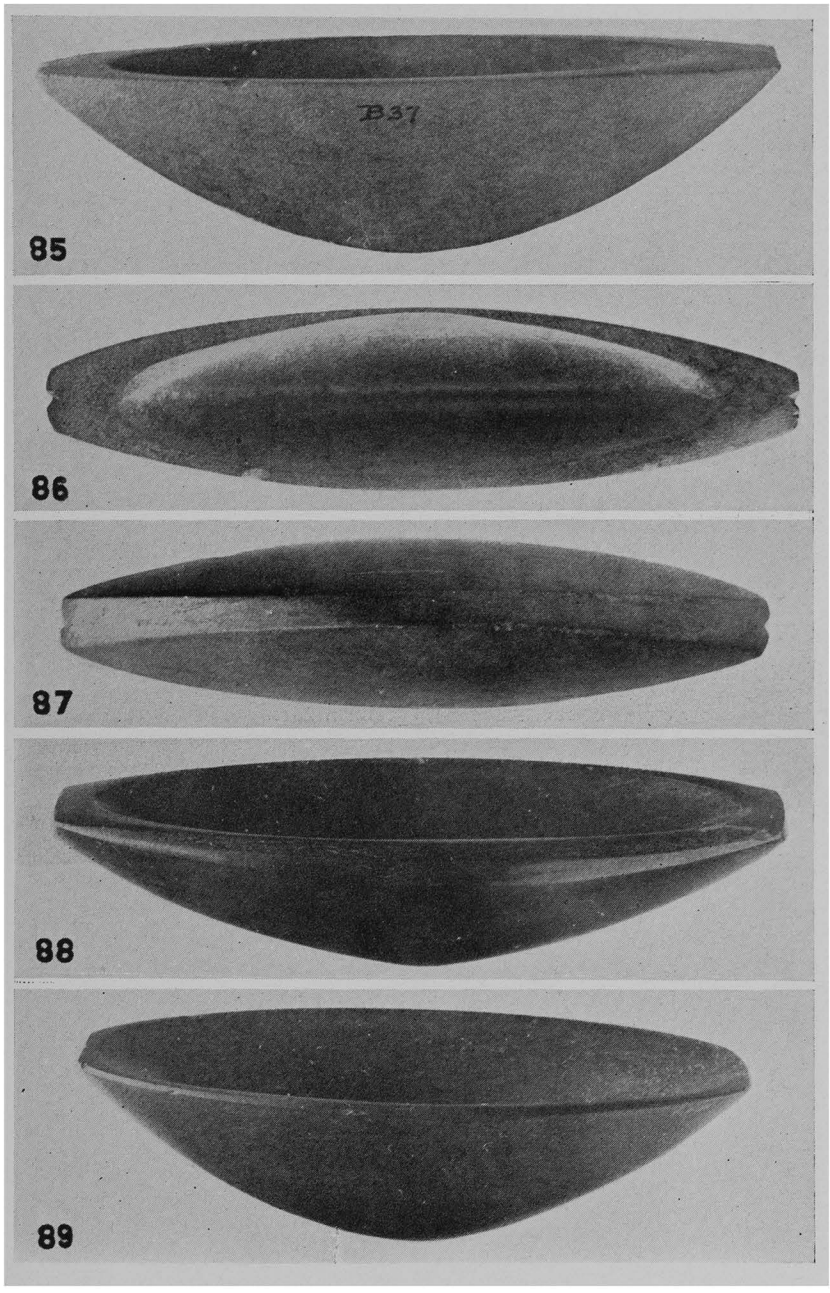
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PLATE 13

The figures on this plate are reproduced at 4/5 natural size.

Fig. 90. View of cavity of specimen 217.

Fig. 91. View of side and cavity of specimen 216; note heavy incised lines.

Fig. 92. Same view of specimen 223.

Fig. 93. Base view of broken fragment, specimen 228.

Fig. 94. Reverse side of the same piece.

Fig. 95. Base view of broken fragment, specimen 231.

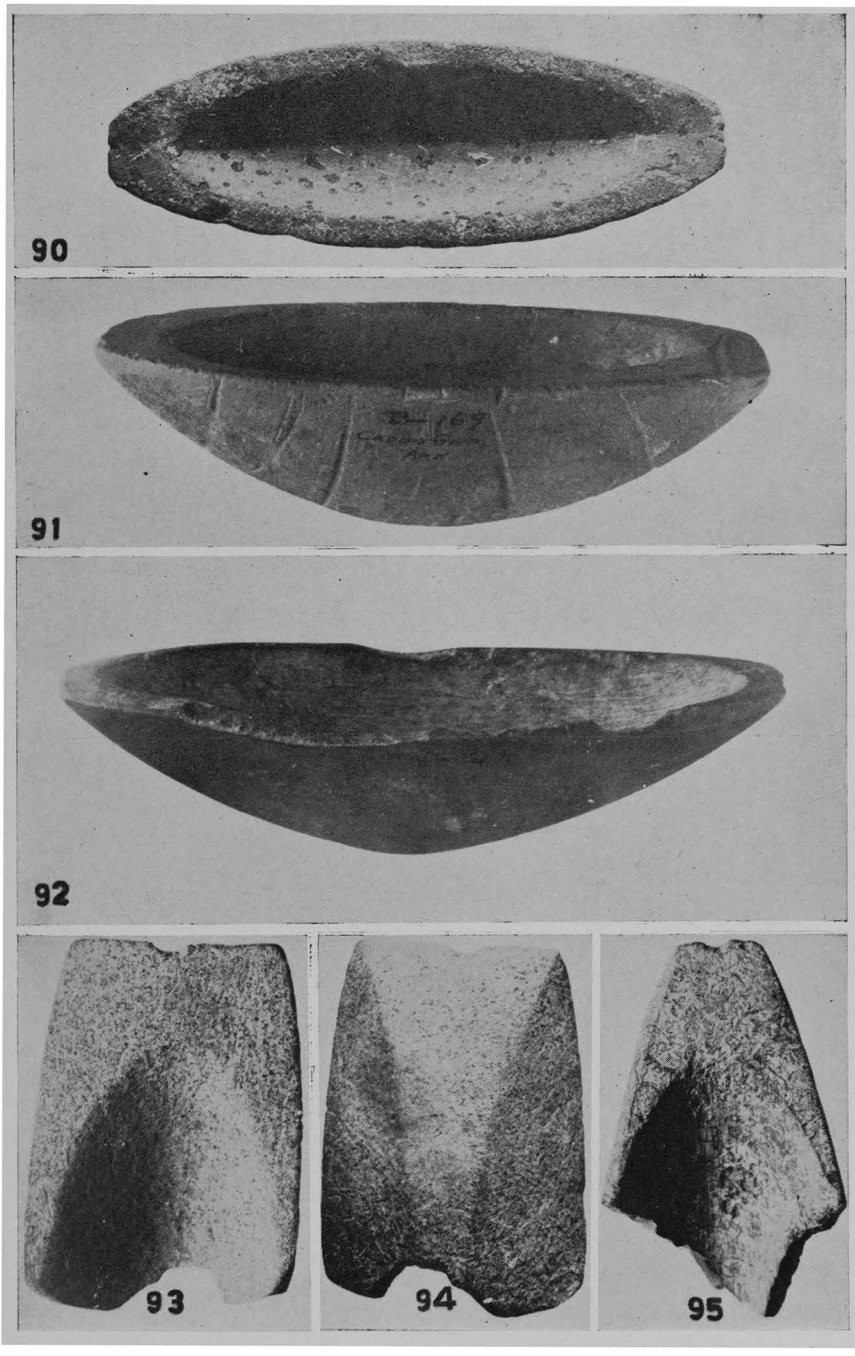
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PLATE 14

The figures on this plate are reproduced at natural size.

Fig. 96. Side view of specimen 226.

Fig. 97. Base view showing cavity and perforations of the same piece.

Fig. 98. Side view of specimen 225.

Fig. 99. Base view showing cavity and perforations of the same piece.

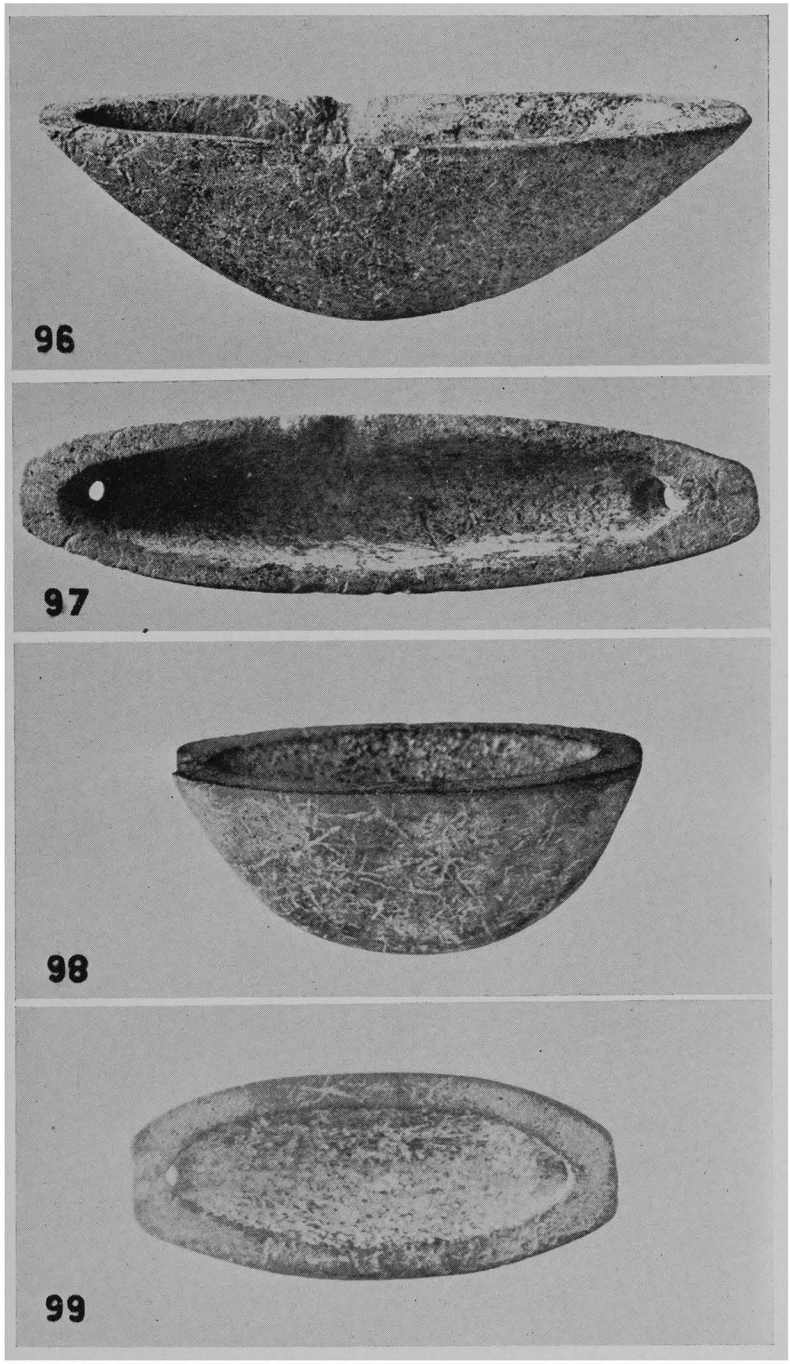
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PLATE 15

The figures on this plate are reproduced at 4/5 natural size.

Fig. 100. Side view of specimen 235.

Fig. 101. Side view of specimen 233.

Fig. 102. Side view of specimen 234.

Fig. 103. Side view of specimen 236.

Fig. 104. View of excavated base of specimen 236.

Fig. 105. View of keel of the same piece.

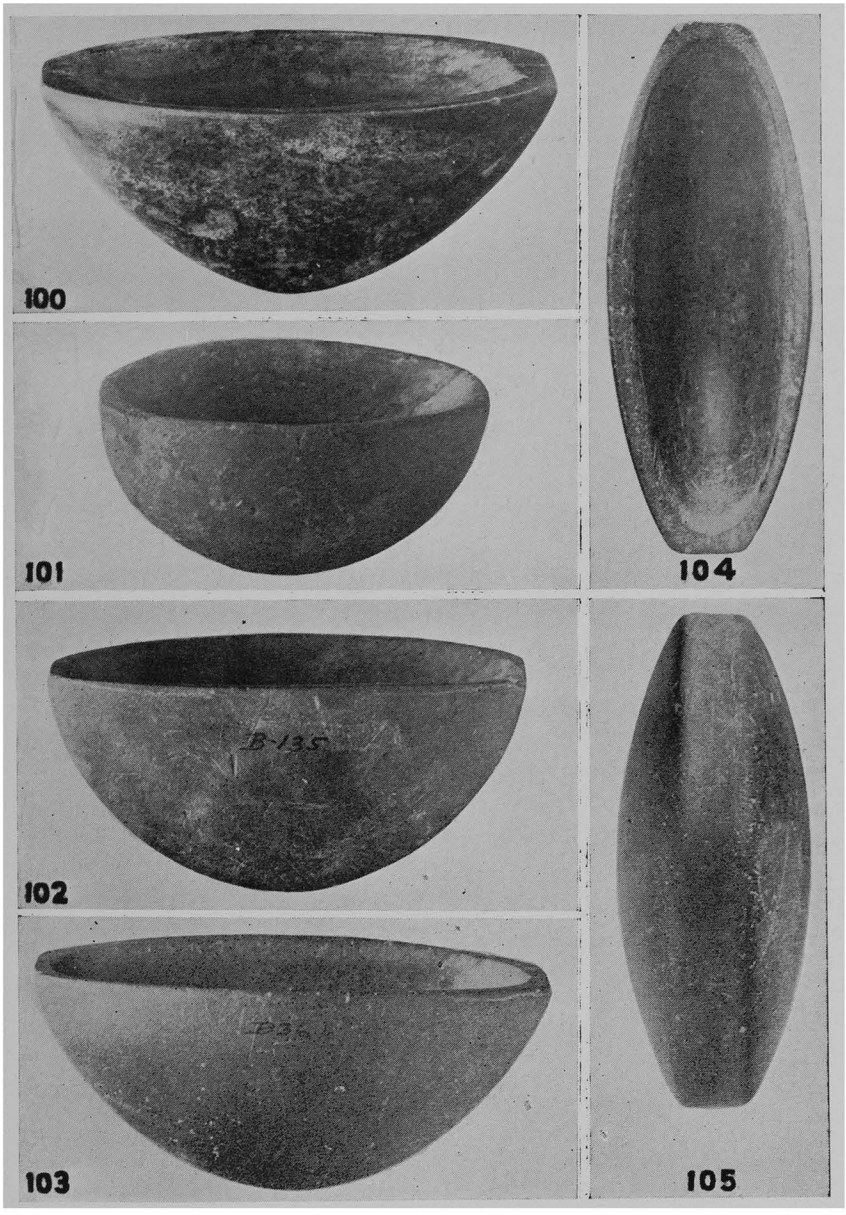
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PLATE 16

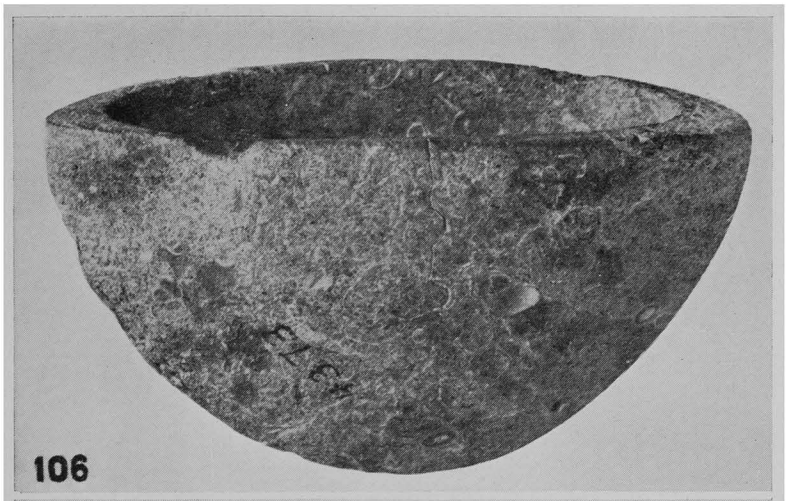
The figures on this plate are reproduced at natural size.

Fig. 106. Side view of specimen 244.

Fig. 107. View showing side and keel groove with transverse notch of specimen 239; composed of gray quartzite with vein of white quartz.

Fig. 108. Side view of specimen 240.

Fig. 109. View of keel of the same specimen.



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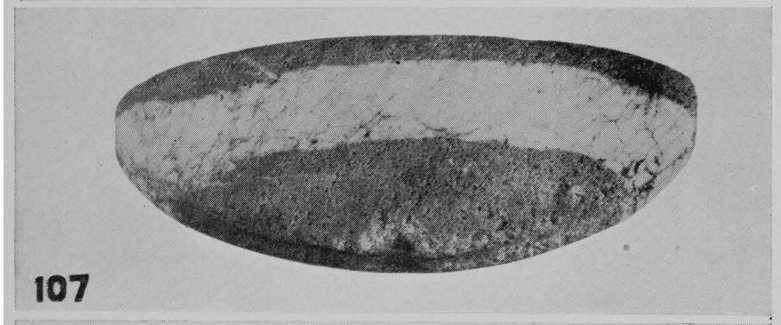

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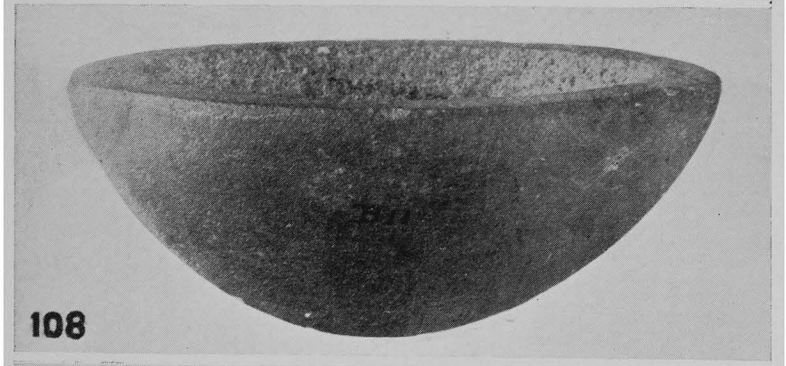

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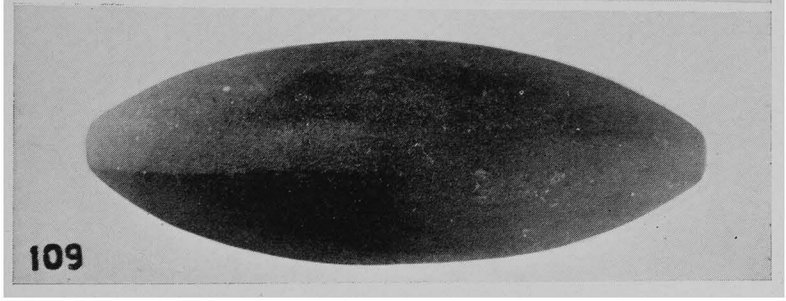


109

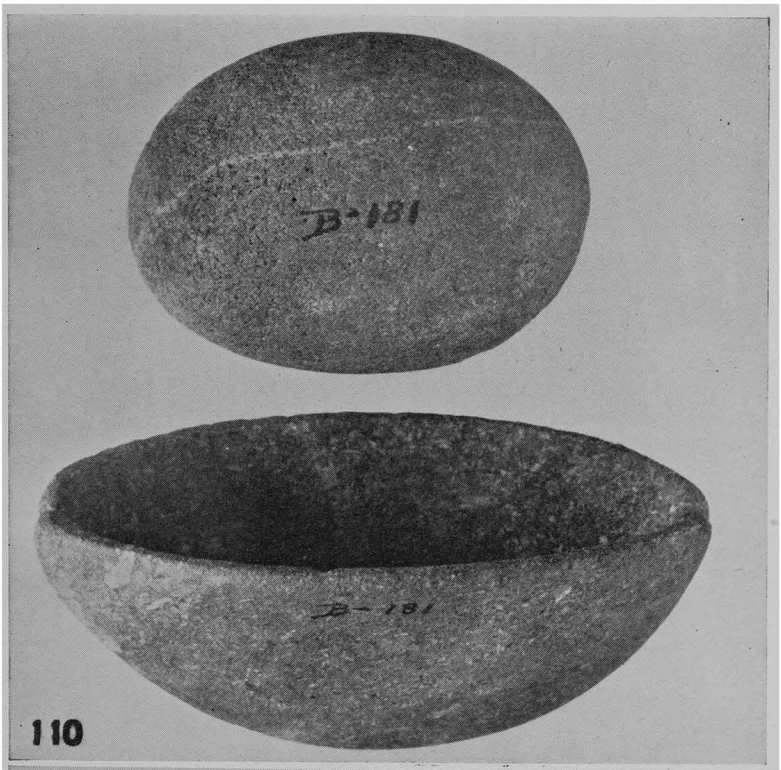
PLATE 17

The figures on this plate are reproduced at natural size.

Fig. 110. View of side and cavity of specimen 251, together with large pebble found near mouth of cavity when piece was discovered.

Fig. 111. View of the keel of the same boat-stone.

Fig. 112. Side view of specimen 252.



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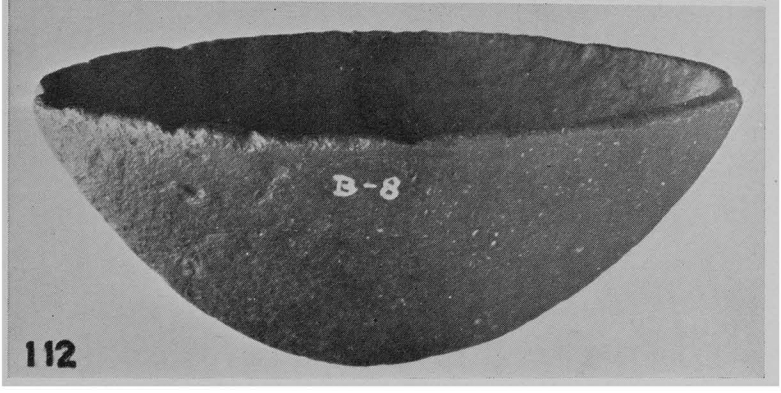

112

PLATE 18

The figures on this plate are reproduced at natural size.

Fig. 113. Side view of specimen 256.

Fig. 114. View of convex edge of same boat-stone, and showing a very fine keel groove.

Fig. 115. Side view of specimen 254.

Fig. 116. Side view of specimen 257.

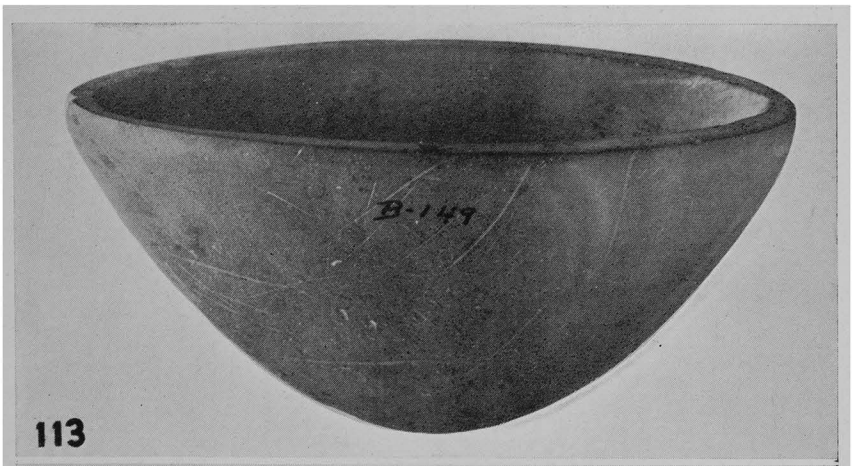

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PLATE 19

The figures on this plate are reproduced at 4/5 natural size.

Fig. 117. Side view of specimen 268.

Fig. 118. Side view of specimen 278, slightly tilted to show keel groove.

Fig. 119. Side view of specimen 277.

Fig. 120. View of convex edge of specimen 260; a crude piece with incomplete keel groove.

Fig. 121. View of convex edge of specimen 267; another crude piece but with complete keel groove.

Fig. 122. View of keel groove of specimen 264; it is one of the finest wrought specimens in the entire group.

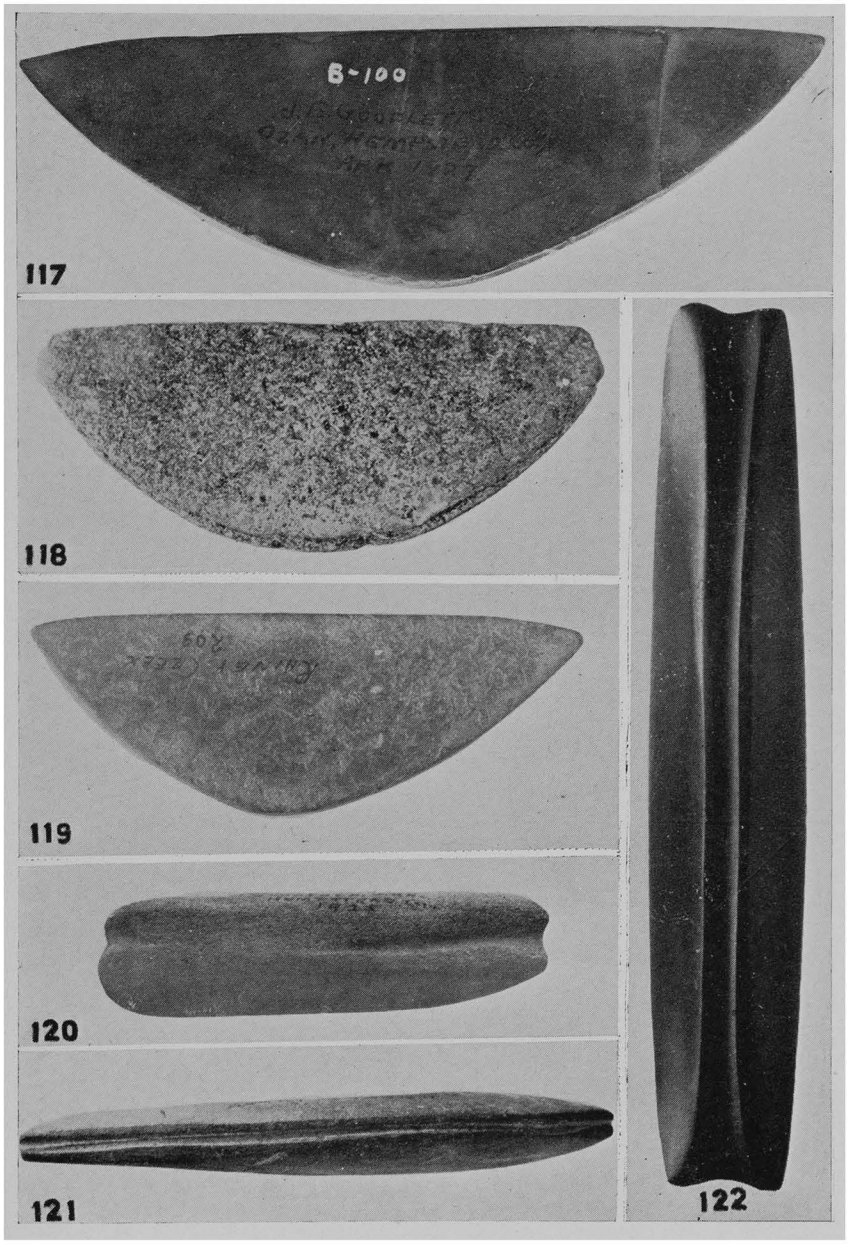
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PLATE 20

The figures on this plate are reproduced at natural size.

Fig. 123. Side view of specimen 276.

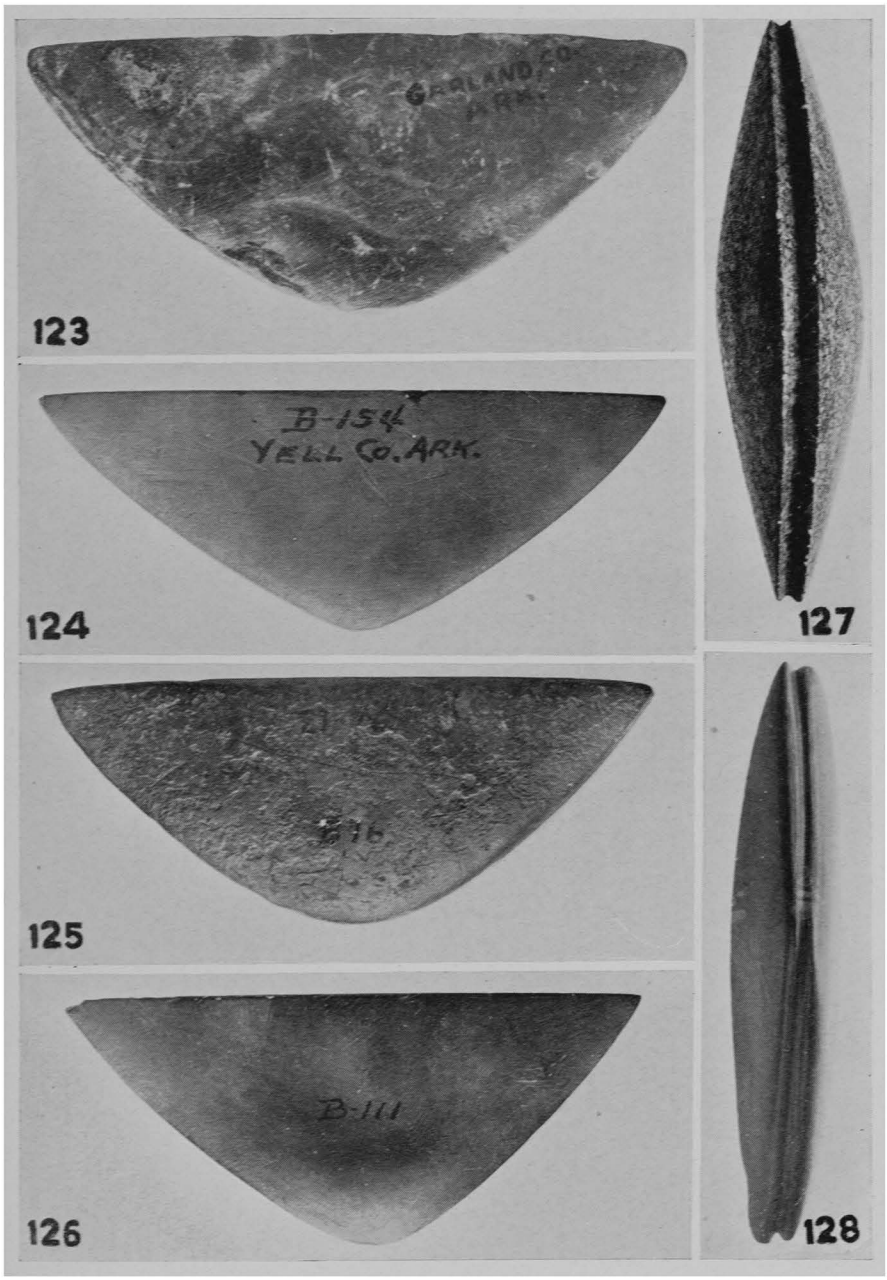
Fig. 124. Same view of specimen 272.

Fig. 125. Same view of specimen 273.

Fig. 126. Same view of specimen 271.

Fig. 127. View showing a beautifully made keel groove, specimen 274.

Fig. 128. View showing keel groove of specimen 275.


GARLAND CO. ARK.
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B-154
YELL CO. ARK.
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B-111
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PLATE 21

The figures on this plate are reproduced at 2/3 natural size.

Fig. 129. Side view of specimen 292.

Fig. 130. View showing side and cavity of specimen 286.

Fig. 131. View of cavity and side of specimen 288.

Fig. 132. View of base and side of specimen 290; note base is unexcavated.

Fig. 133. View of side and cavity of specimen 302; the right end was broken and has been repaired.

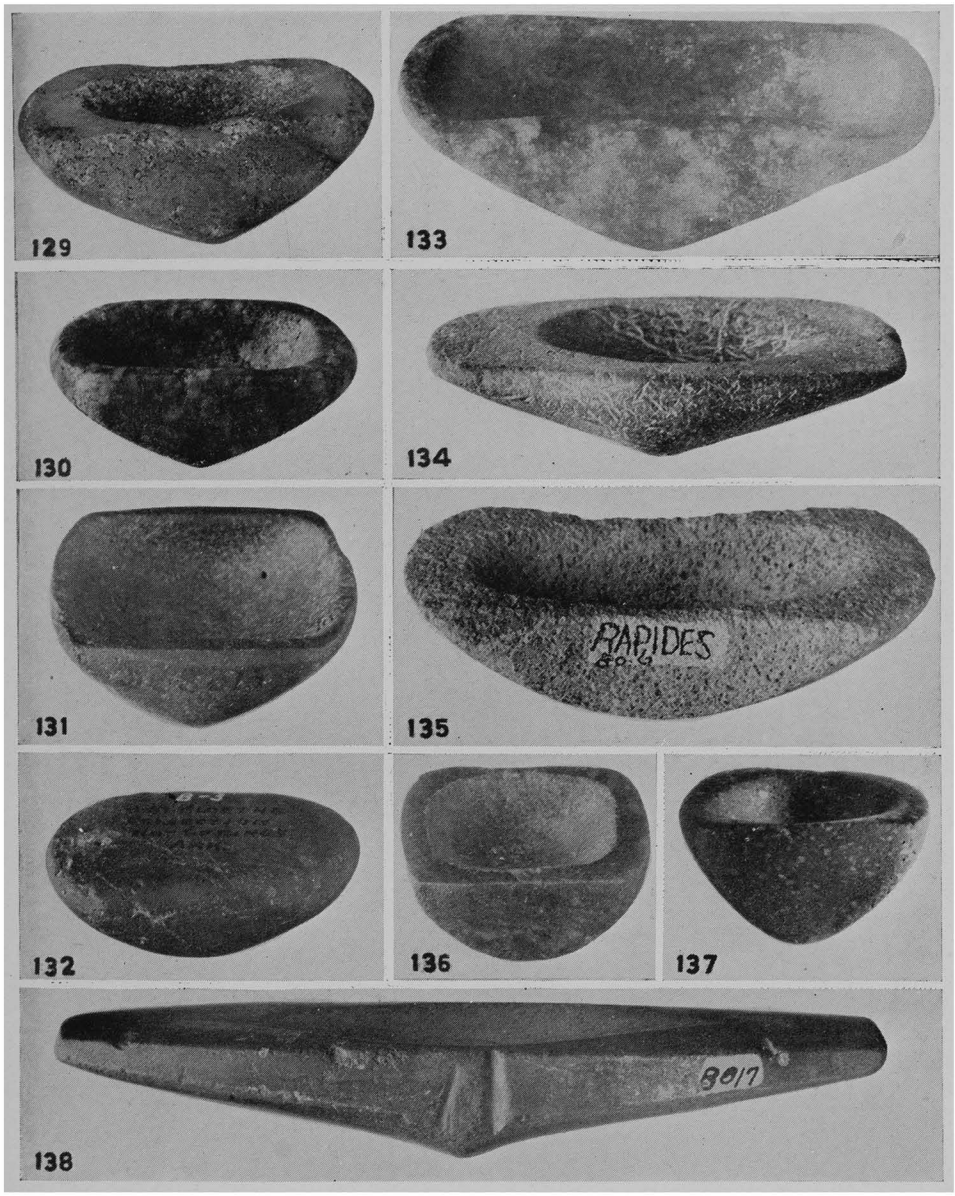
Fig. 134. Side view of specimen 300.

Fig. 135. View of side and cavity of specimen 301.

Fig. 136. View of side and cavity of specimen 281.

Fig. 137. Side view of specimen 291.

Fig. 138. Side view of specimen 303.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RAPIDES
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PLATE 22

The figures on this plate are reproduced at 4/5 natural size.

Fig. 139. Side view of specimen 306.

Fig. 140. Base view of the same piece, showing circular cavity and the perforations.

Fig. 141. Side view of specimen 308.

Fig. 142. Base view of the same piece.

Fig. 143. Base view of specimen 309.

Fig. 144. Base view of specimen 307.

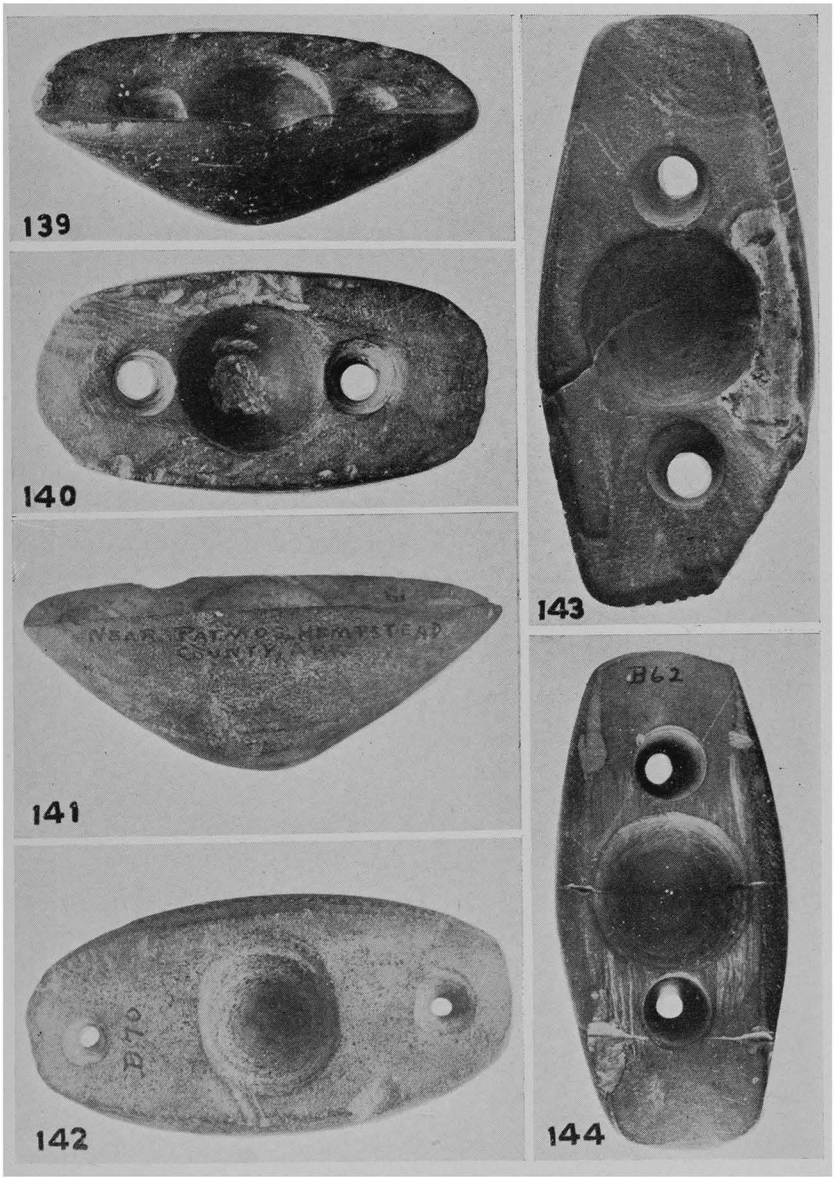
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PLATE 23

The figures on this plate are reproduced at 4/5 natural size.

Fig. 145. Side view of specimen 311.

Fig. 146. View of the side and cavity of the same piece.

Fig. 147. Base view of the same piece.

Fig. 148. View of side and cavity of specimen 320.

Fig. 149. Base view of the same piece.

Fig. 150. Base view of specimen 319.

Fig. 151. Side view of specimen 323.

Fig. 152. End view of the same specimen.

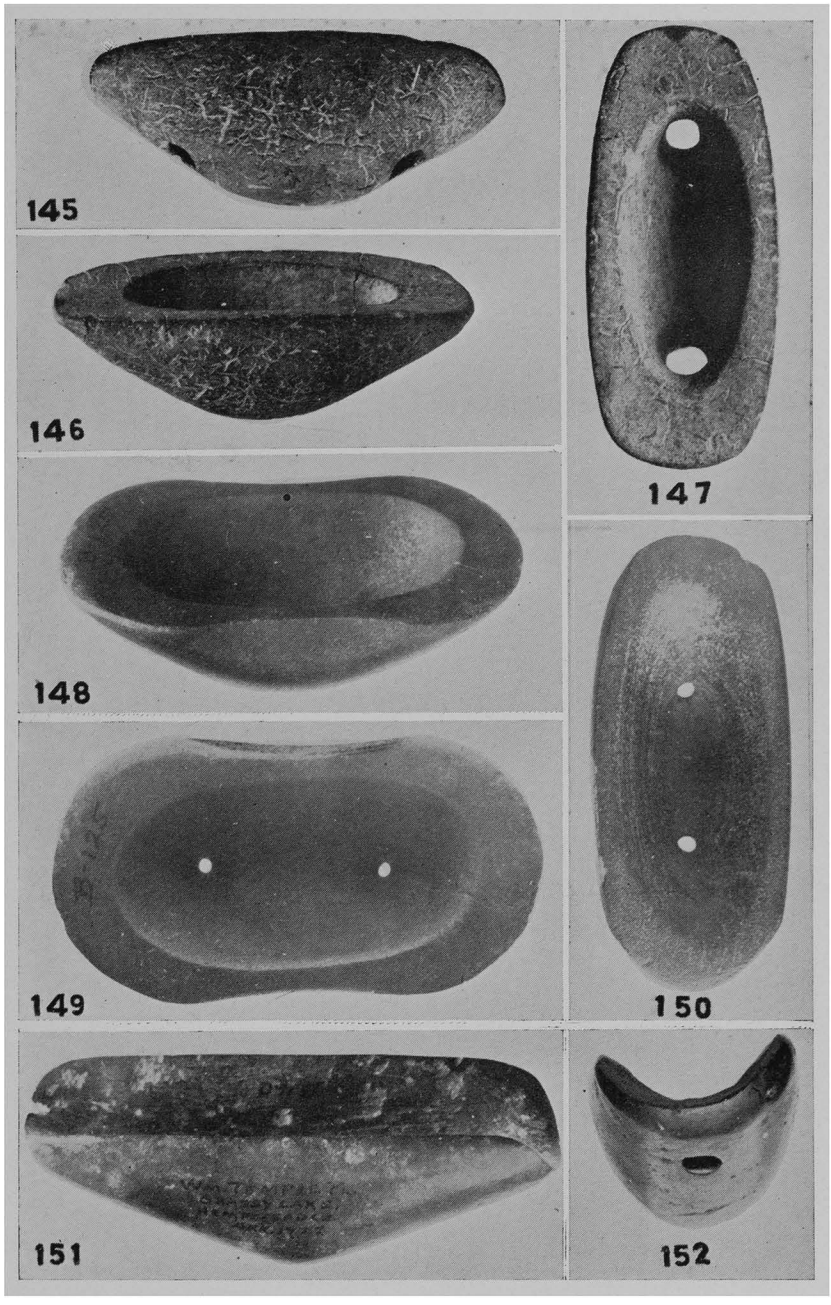
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PLATE 24

The figures on this plate are reproduced at 8/9 natural size.

Fig. 153. Side view of specimen 322.

Fig. 154. Side view of specimen 317.

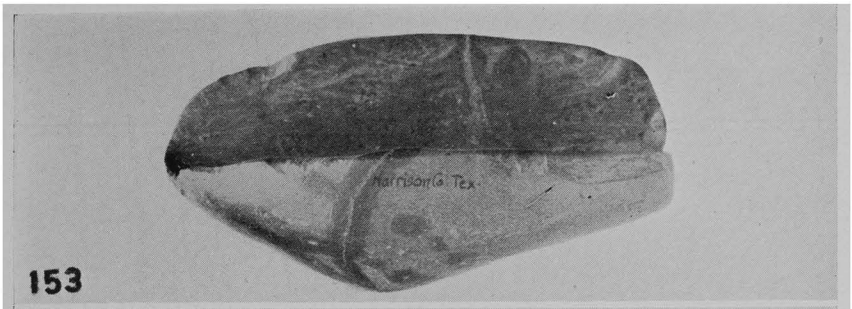
Fig. 155. Base view of the same specimen; shows reconstruction on the upper side of the print.

Fig. 156. Excavated cone-shaped piece, specimen 328.

Fig. 157. Excavated cone-shaped piece, specimen 329.

Fig. 158. Cone-shaped piece made from a six sided pyramidal end of crystal quartz, specimen 327.

Fig. 159. A truncated hollow cone, specimen 330.



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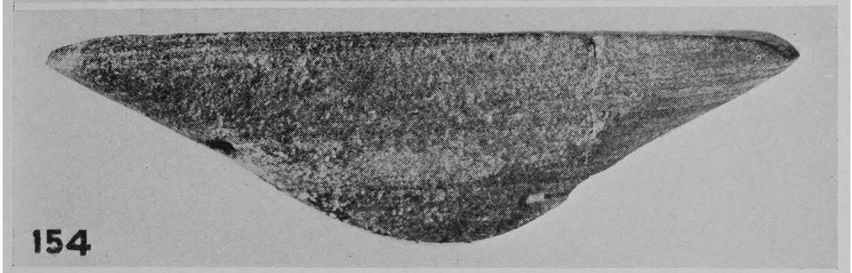

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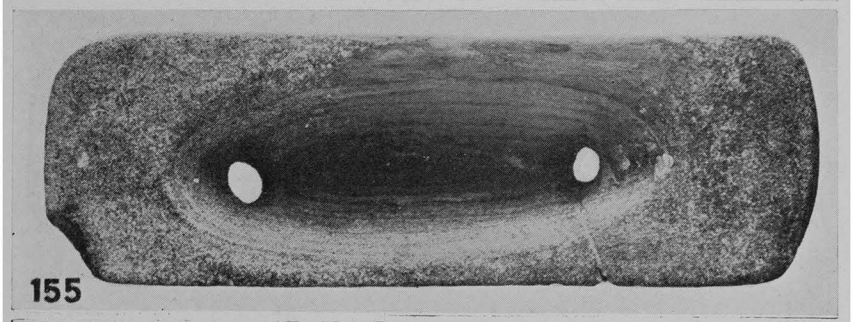

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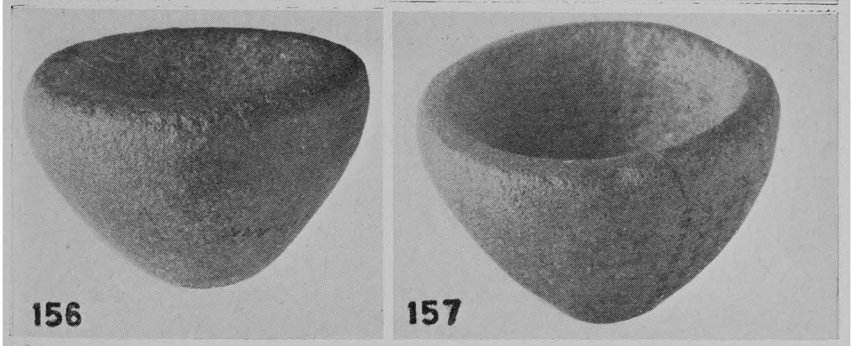

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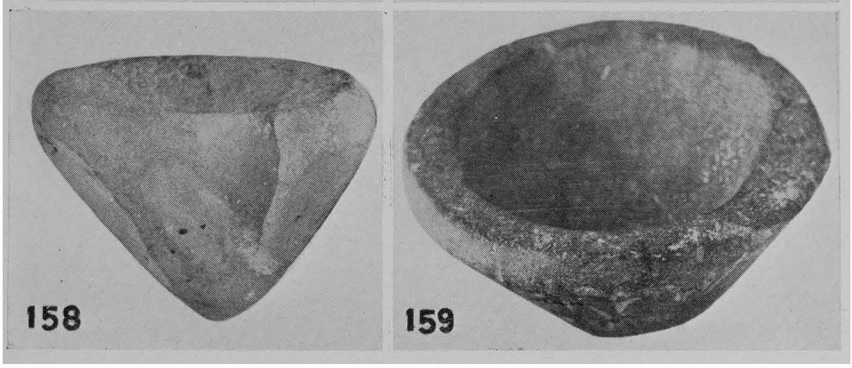

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PLATE 25

The figures on this plate are reproduced at 4/5 natural size.

Fig. 160. Finely made hollow cone, specimen 331.

Fig. 161. Side view of small spherical piece with two perforations, specimen 324.

Fig. 162. Circular cup with two perforations, specimen 326.

Fig. 163. Side view of large boat-shaped piece made of shell, specimen 355.

Fig. 164. Side view of small boat-shaped piece made of shell, specimen 354.

Fig. 165. View of specimen 337; the two perforations at the ends do not show in this view.

Fig. 166. Base view of copper boat-stone, specimen 356.

Fig. 167. Side view of specimen 334.

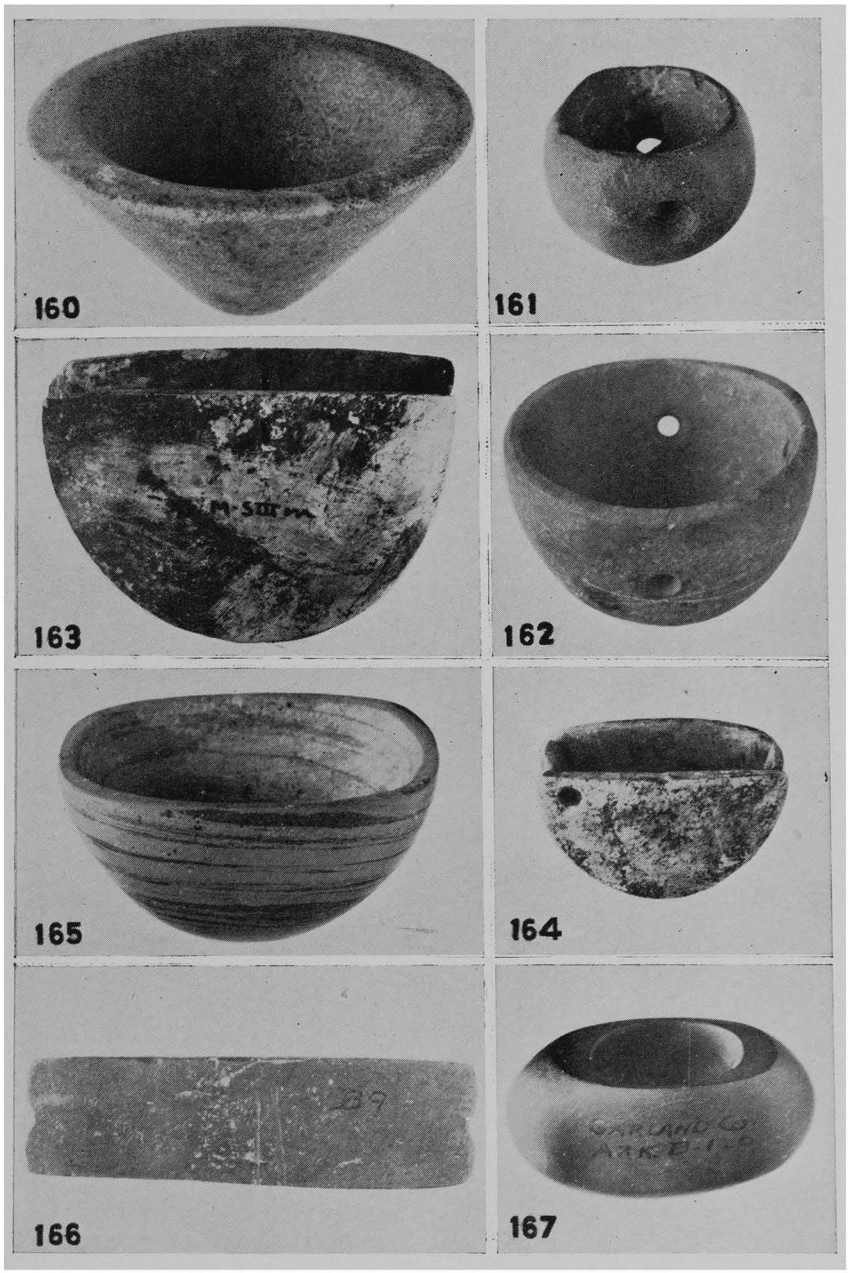
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PLATE 26

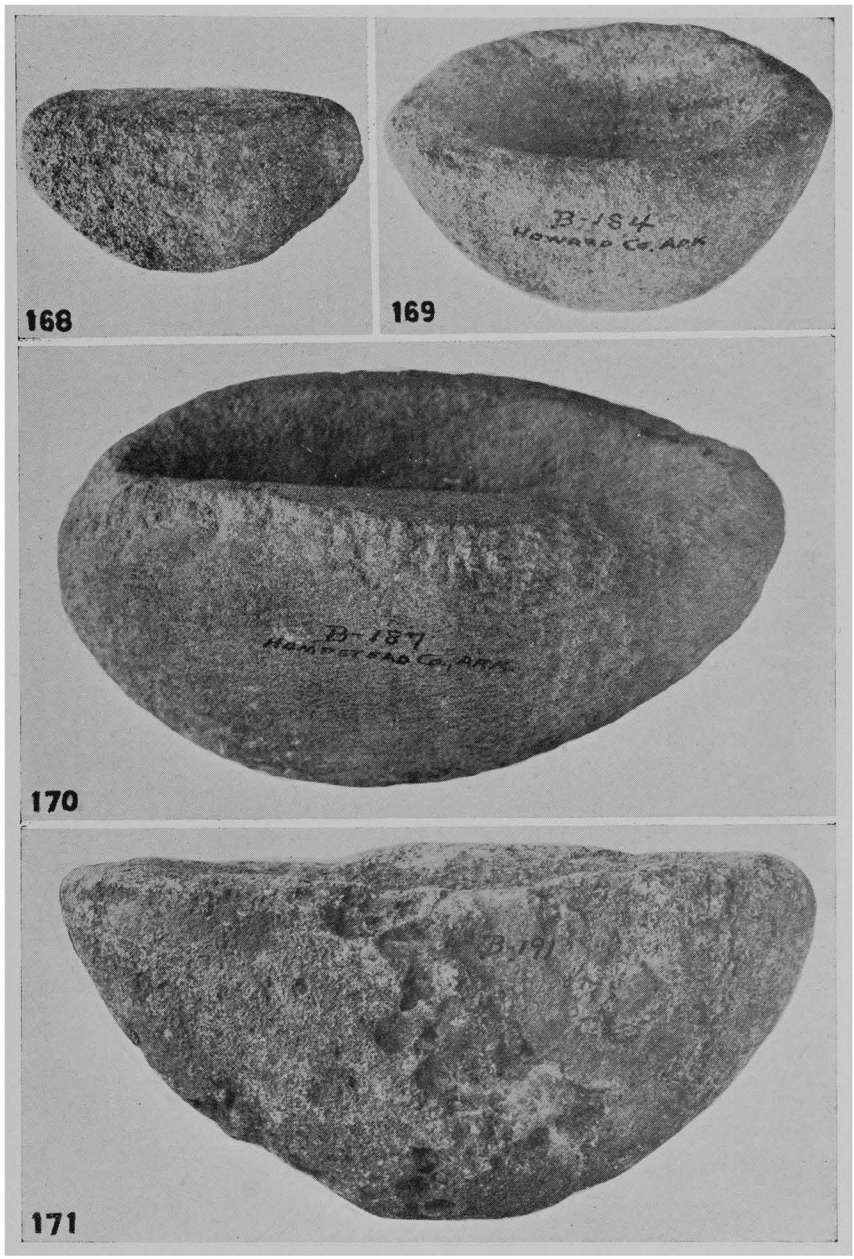
The figures on this plate are reproduced at 4/5 natural size.

Fig. 168. Side view of unfinished boat-stone, specimen 349.

Fig. 169. A similar specimen, but with the cavity pecked out, specimen 350.

Fig. 170. Side view of an unfinished boat-stone showing the first steps in the grinding process, specimen 352.

Fig. 171. Another unfinished boat-stone, composed of limestone and extensively weathered, specimen 351.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B-184
HOWARD CO. ARK
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B-187
HEMPSTEAD CO. ARK.
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B-191

PLATE 27

Three views of a bird-mammal effigy boat-stone from the Temple Mound, Le Flore County, Oklahoma. The upper figure is reproduced at approximately natural size, the two lower figures at less than natural size. Courtesy of the Museum of the American Indian, New York.

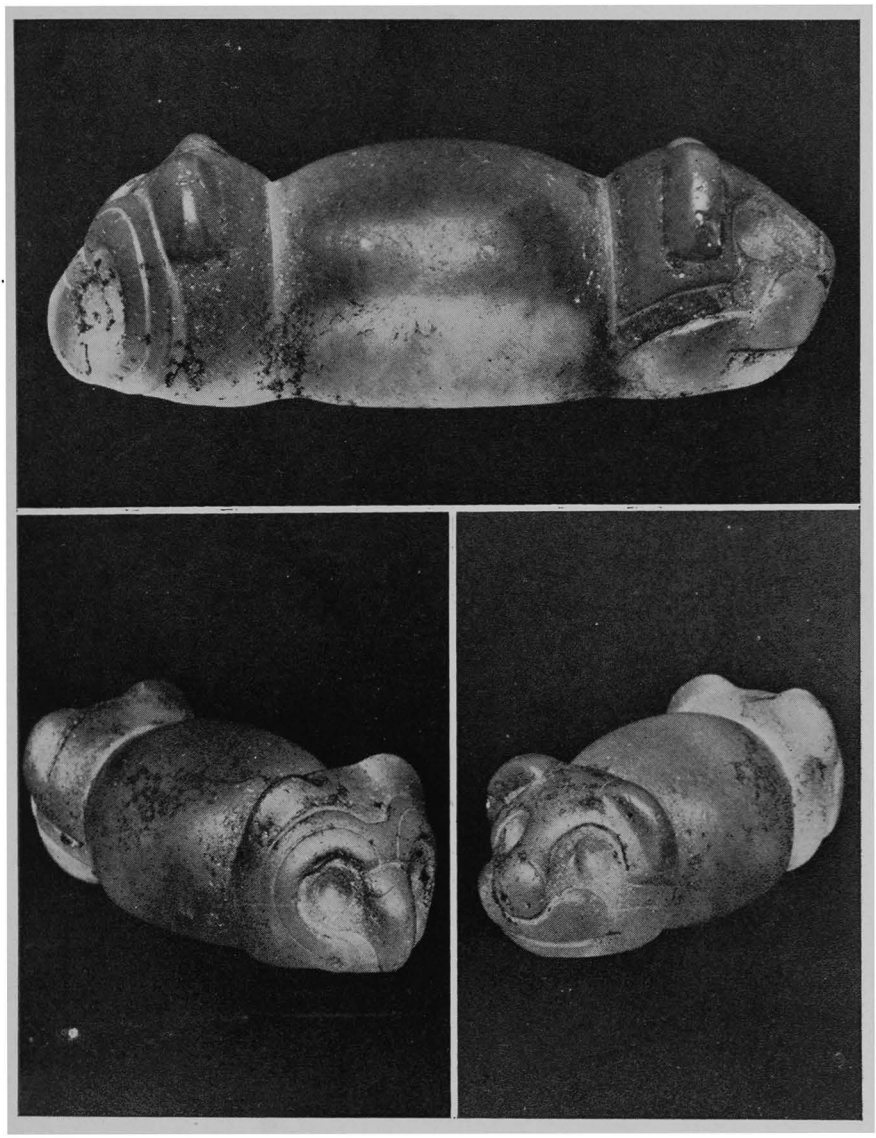


PLATE 28

After the tables and plates for this paper had been completed, Mr. A. T. McDannald of Houston, Texas, kindly loaned his collection of twenty-four boat-stones from Arkansas and Oklahoma. This added plate illustrates five of his specimens. The figures are all reproduced at 7/11 natural size.

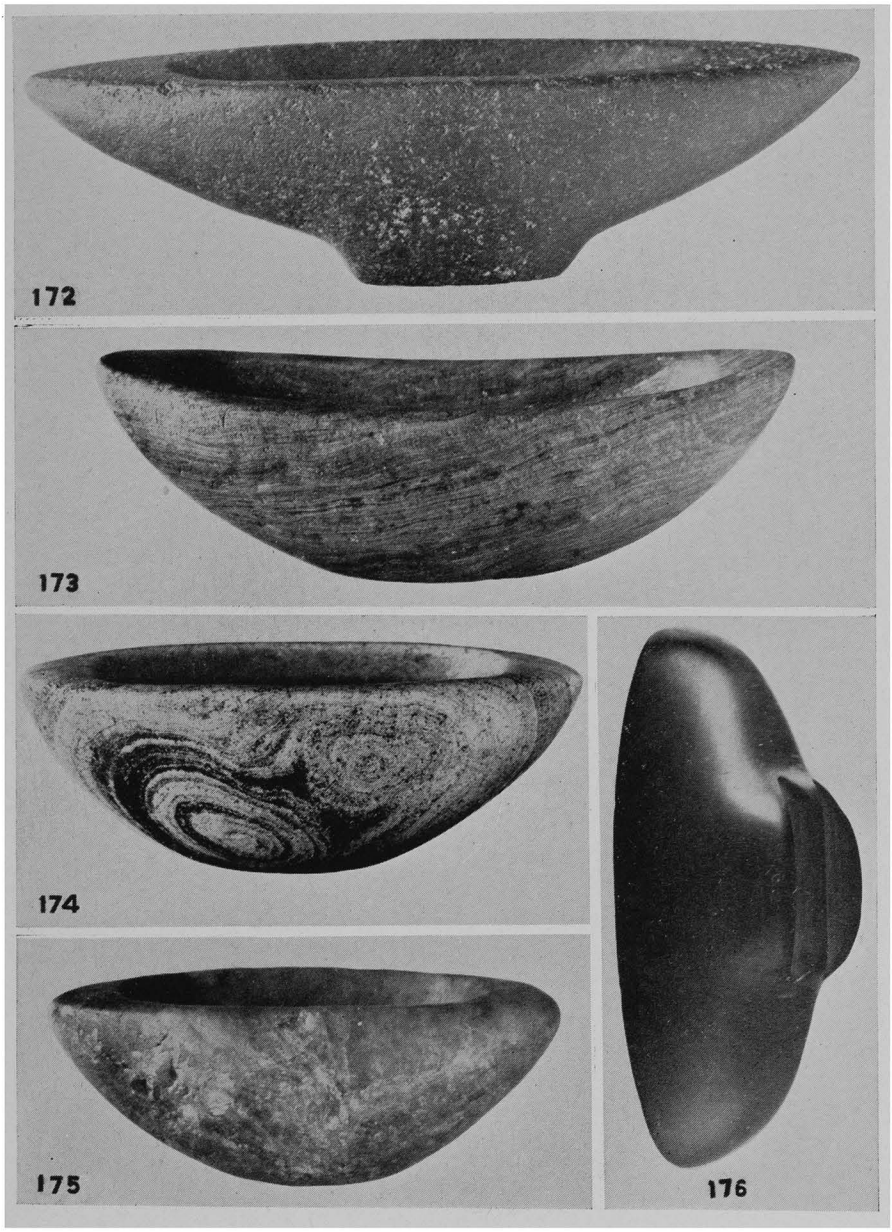
Fig. 172. Side view, McDannald Collection, No. 3883.

Fig. 173. Side view, McDannald Collection, No. 2486.

Fig. 174. Side view, McDannald Collection, No. 3577.

Fig. 175. Side view, McDannald Collection, No. 3285.

Fig. 176. View showing double keel groove, McDannald Collection, No. 2675.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